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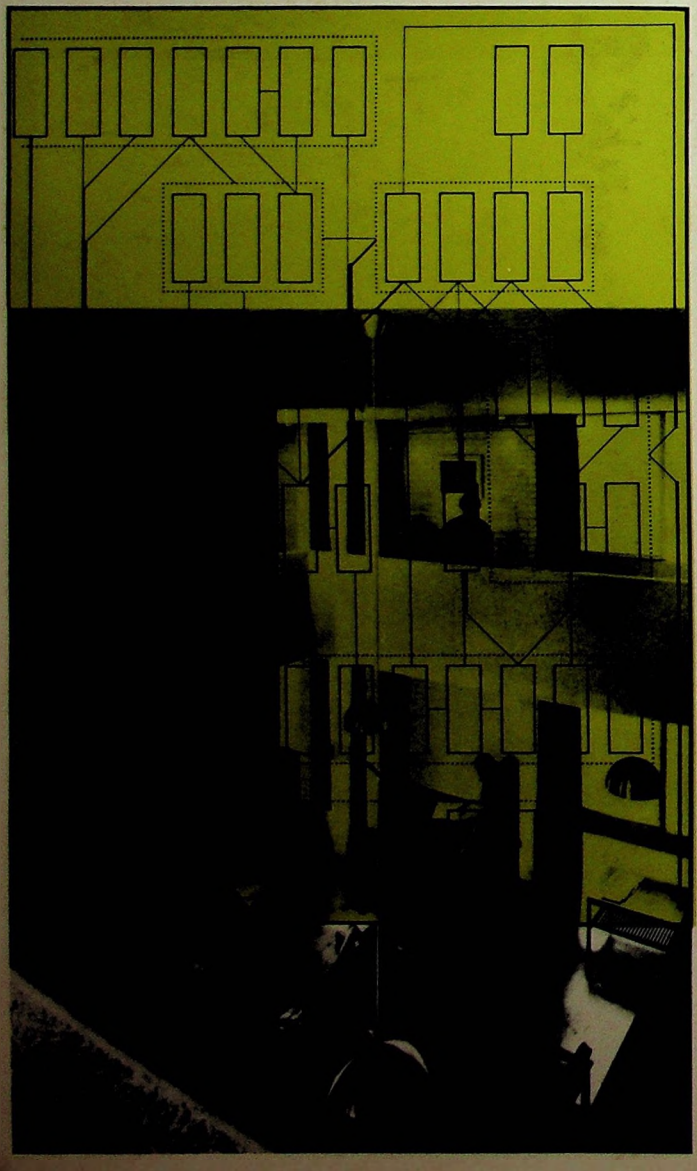
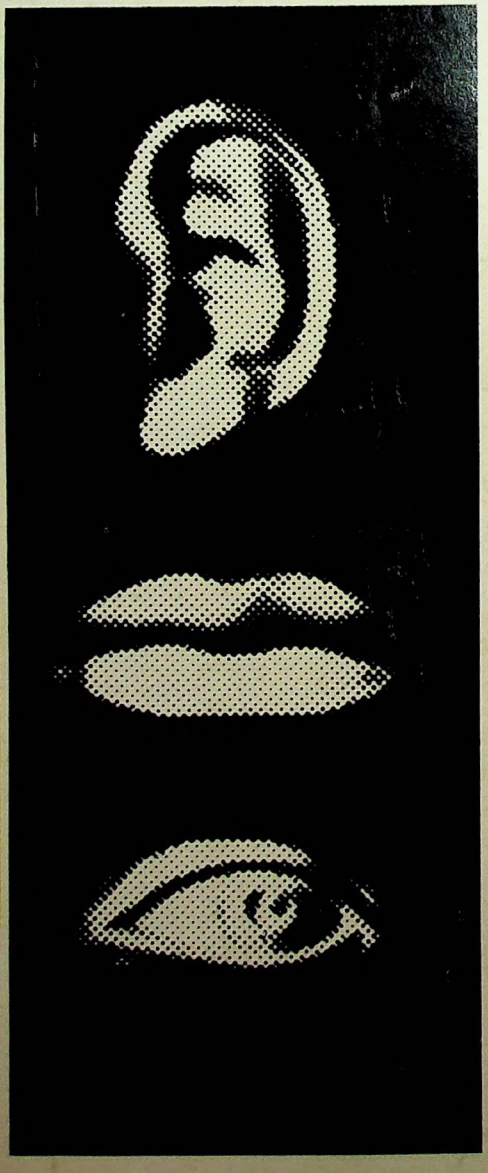
UNIVERSITIES

APRIL 1968





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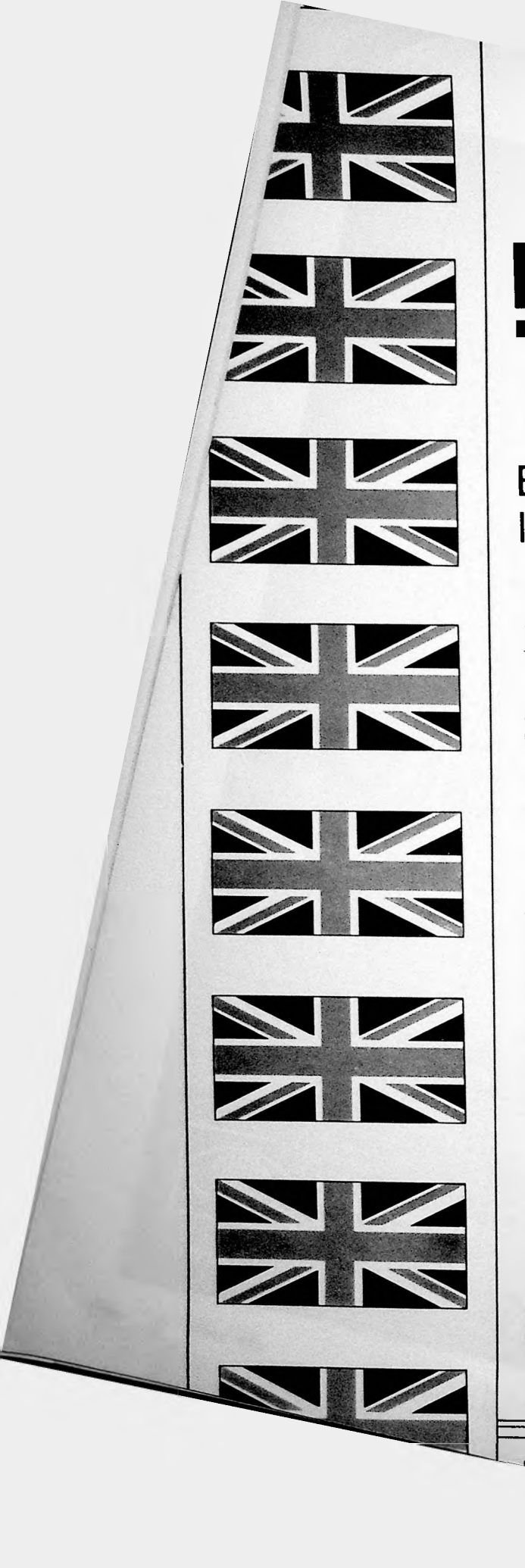

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citizen participation

Official Architecture & Planning

APRIL 1968
VOL 31 NUMBER 4

More public participation in planning is desirable. One of the great hopes for the new system envisaged in the Town and Country Planning Bill now before Parliament is that the public would become much more closely involved in the making of development plans. One of the oddest features of the present system is that the public, who often stand to gain or lose most, are not involved until plans are cut and dried. If they object and the objections are sustained, the result is often expense and delay while modifications are made. On the one hand there is a desire for more consultation and wider association of the public with planning; on the other, there is the need for quicker decisions. The planning process is already too complicated and subjects society to much delay and frustration. Efforts made to involve the general public are therefore fraught with immense difficulties.

The Government now proposes to satisfy these requirements by streamlining planning machinery in a reaffirmation of faith in local democracy—that people on the spot ought to take the planning decisions which they are going to have to live with—by devolution of responsibility for some planning and by the simplification of procedure.

Such a tentative and non-committal statement of intent is welcome, but there are obvious dangers of complacency and self-satisfaction. The picture of an eager population awaiting decentralisation and simplification of planning procedures so that it can rush forward to play a constructive role in planning its environment is not a convincing one. Citizen opposition by articulate groups, well financed and led, with a developed political awareness and stirred by the threat of an airport or an overspill project, is easily aroused. But fruitful participation which will unearth the intangibles of a community requires a conscious effort on the part of planning authorities to establish facilities for communication and action by a public which must be persuaded rather than simply permitted to have its say.

The problem is basically one of public education. There is a need to overcome the "we—they" perspective which has come to characterise the relationship between the government and the citizen. This state of mind causes loss of democratic values and ultimately in participation in the processes of local and civic leadership. The problem is aggravated by difficulties of communication with the public, stemming from persistent use of technical language and jargon by professionals.

Unless the basis of public education begins early there is little reason to expect improved public understanding of urban problems. Accordingly, a broad effort should be made to focus attention on urban issues throughout the curricula of elementary and secondary schools. There is also a need to generate increased awareness and sophistication about urban issues through carefully constructed education programmes for such groups as business leaders, public administrators, including educational administrators and particularly those in universities. These programmes should be the responsibility of both national and local government and should range from training programmes within city government to adult education and efforts such as documentary films, dramatising problems and the action required. It should also include well-organised publicity campaigns within each authority's area together with regular talks, discussions and exhibitions.

A committee of public participation in planning has now been set up by the Minister of Housing and Local Government to consider ways in which the public may make a greater contribution to the formulation of development plans for their areas. This makes it clear that the Government attaches great importance to public participation and to giving proper publicity to plans while they are still at the formulative stage. It is envisaged that the committee will examine how these aims may be achieved. Members represent a wide range of interests and expertise. They include both members and officials of local authorities, and persons from the press, the general public and government departments.

There are many known and tested techniques for inviting public reaction to planning proposals—the public inquiry is the best-known and most-often used example. More must be developed involving participation in the initial goal-setting process right through to evaluation of final plan proposals. Such activities can usefully inform the planners and administrators of people's attitudes to possible courses of action. But of paramount importance is that such a procedure could ensure recognition of the wishes and needs of individuals and groups who might otherwise be ignored by the planning process, or excluded from community discussion of plans.

comment

after the budget

The 50 per cent. increase in Selective Employment Tax imposed in the Budget will cost the building industry £40 million, making the total annual SET bill for the industry about £120 million, and adding one per cent. to building costs generally. It is a serious enough load for the industry to bear, particularly when viewed in the context of earlier cutbacks in public investment of £115 million in 1968/69 and £170 million in 1969/70. And the view of the Minister of Public Building and Works that it may ultimately be for the good of the construction industry does not lessen the load one bit.

An encouraging sign is the policy of the MoPBW that design and planning work should continue, not only on projects to be included in the 1968/69 and 1969/70 public sector programmes but also on projects with a firm prospect of inclusion in the programme for subsequent years. It remains to be seen to what extent this declaration of policy is put into effect. It would certainly make for a smoother work flow for architects and guard against rising building costs and delays when restrictions are eased. As Sir Hugh Wilson put it in a letter to the Minister earlier this year, "the deferment of capital projects could be turned to good advantage by using the time gained to further the ideal of investment programming as outlined recently at the RIBA by Sir Antony Part".

Here much depends on the readiness of the MoHLG to give loan sanctions for design fees for projects that have been deferred. However, the fact that the level of public expenditure for this year and next has been fixed from £300 to £400 million lower than had previously been planned means that room for manoeuvre is limited. In spite of the Government's declared policy to ensure that design work will continue wherever possible, with special priority for the hospital programme, the reductions in local authority capital programmes is bound to reduce the amount of design and planning work.

The fact is that the building industry, given its structure and the time scales to which it operates, is as usual being made to bear too much of the burden arising from the Government's attempt to achieve "a massive shift of resources". The SET tax is in itself a formidable burden; that the Government may have begun to realise this is indicated by the appointment of Professor Reddaway of Cambridge University to conduct an enquiry into its effects on the industry. At least this is a recognition that the problem exists.

south east planning strategy

We criticised the Report of the South East Planning Council, published last November, on the grounds that it was premature, and for failing to put forward guide lines for the *comprehensive* development of the region (*OAP*, December 1967). The Government has now accepted the need for further planning study, taking the Planning Council's proposals as its starting point. This work will be carried out under the control of a full-time professional team consisting of Government planners and the Standing Conference staff, and led by the MoHLG chief planner Dr Wilfred Burns. The fact that it will be done under the supervision of a broadly based team, including local planning authorities, is heartening. However, it is important that the new study does not result in needless delays in planning decisions. The Government claims that planning in the medium term can continue on the basis of local development plans and the decisions already taken following the Government's review of the South East Study. Does this mean that *A Stragegy for the South East* is being shelved? It certainly does not sound like an acceptance. Now, presumably, we must wait for the definitive strategy.

Section of the new model of Bristol Central Area, now on display as part of the city's permanent planning exhibition. The exhibition has now been extended to illustrate the continuous process of detailed design and development work following the preparation of the overall development plans—altogether a worthy exercise in making the public more fully aware of planning decisions

next month

The theme of the May issue of "Official Architecture & Planning" will be designing for the elderly and disabled. We shall also be publishing an extended appraisal of the Report of the South East Planning Council. Articles in the series on History of Town and Country Planning and Village Planning, which had to be held over because of pressure on space, will be resumed next month.

letters to the editor

TERENCE BOSTON, MP
IAN M FULTON
Dr J E PRENTICE

the third london airport

Sir,—Now that there is to be a new inquiry into the third London airport, there is even greater need for a reply to the article in the January 1968 issue of *Official Architecture and Planning*. It is good to see any serious study of the arguments for and against possible sites, provided this is based on sound information. Your contributor concluded that Sheppey was "the most suitable coastal site". This is alarming enough, but what is even more alarming is the fact that the material on which this conclusion is based is open to question on many major points.

Parts of the article indicate a rather slap-happy approach. Take Table 1 (showing comparative data about different sites): this has not been amended according to the Errata Sheet issued with the Noise Abatement Society report advocating Foulness, from which it was presumably taken. The amended figures make Foulness a much more likely site for the airport on the aspects covered. Again, Figure 2 (examples of time-tables of local authority redevelopment schemes): this appears with no explanation as to its significance and is not referred to at all in the text. Then Table 3 (distances between three possible airport sites and the Chunnel interchange and Tilbury): this includes what appear to be distances measured as the crow flies—without allowance for such new routes being made in the costings.

These particular inaccuracies are not necessarily basic to the main argument, but they prompt one to wonder about the validity of some of the less easily checked material. Table 1, for instance, shows 53 I/II buildings and 94 on the supplementary list within a 5-mile radius of a possible airport on Sheppey. Yet the town of Faversham, lying less than 4 miles from one of the suggested runways, has some 130 listed buildings and a further 170 on the supplementary list.

With these examples in mind, I cast a particularly wary eye on Table 2 which attempts a comparative costing of the Sheppey, Foulness and Stansted sites, particularly since the estimated total cost of Sheppey and Stansted are miraculously identical. Even a superficial examination raises very serious doubts indeed.

Two items give a tremendous boost to Stansted's costing compared with the other two sites—loss of agricultural land and "cost of noise". On the first item, the cost for Stansted is estimated as £30m over 15 years, whilst only £2m is allowed for the other two sites. So far as Sheppey is concerned an airport itself would be largely on marshland, but the inevitable ancillary development and housing (which is allowed for in the Stansted costing) would mainly be located on the mainland. And this is in an area with some of the richest agricultural land in the country—one of Britain's two main horticultural areas, the heart of the Kent fruit belt—indeed, in world terms, it has been described as second only to the Canadian wheat belt. To allow only £2m over 15 years for the loss of such land is clearly a gross underestimate.

The "cost of noise" is based on the assumption that a 5-mile radius from the airport is a relevant criterion for assessing the cost of compensation to householders and the rebuilding of schools, hospitals, etc. A far more relevant criterion would be the NNI contours which, far from being circular, are long and narrow in shape. Taking Stansted as an example, the importance of this can be seen in the fact that with the proposed realignment of the runways it is estimated that about 3,500 dwellings would come within the 45+ NNI contour. This compares with the 10,565 private households within a 5-mile radius on which the calculations in the article are based. At £2,000 per house these new runway proposals reduce the Stansted costings by £14m. Similar considerations apply to the number of schools likely to be involved, and at the assumed cost of £500,000 per school this could be a major source of inaccuracy.

There is an additional potential error in the costings on school replacement. The assumption is made that the average cost per school would be the same at Sheppey, Stansted and Foulness. But cost per school must be related to size, and comparison of the number of schools within a 5-mile radius with the total population in the same area strongly suggests that the schools in the Sheppey area are, on average, very much larger than those at Stansted or Foulness (Sheppey : 1 school per 2,160 population; Stansted : 1 per 1,200; Foulness : 1 per 975). With such wide differences in the probable sizes of the schools, it is impossible to accept that the average cost of replacement for each school would be the same in each area, and that it would cost £13½m to replace 27 smaller schools at Stansted but only £7m to replace 14 larger schools at Sheppey.

There are numerous other points in the article which cannot be accepted at their face value. For instance, it would be interesting to know the original source for the relatively good visibility records for Sheppey in Figure 4. At the Stansted public inquiry the figures quoted as referring to Sheppey were in fact taken at Shoeburyness, Woolwich, Gravesend and Southend—and not at Sheppey. Locally, the low-lying area where an airport would be sited is known to be a fog pocket. And surely, even if the official figure of £25m for replacing Shoeburyness firing range were found to be too high, the £8m quoted in the article is going to the other extreme.

The article has one final major shortcoming : it fails to take into account various other important factors which apply to Sheppey (and Foulness) but not to Stansted. Sheppey is a major centre for holiday and recreational facilities. At any one time during the summer months there are some 30,000 holiday-makers living on the island. If each of them came for two weeks, the total turnover during the season would be at least 300,000 people. But the total number of holiday visitors is actually very, very much higher because so many come for only one week, or a weekend, or one day. Sheppey has 55 holiday camps. If an airport came, another site for these holiday-makers would be needed on the south-east coast within equally easy reach of London. The article makes no mention of the cost of this alternative site, nor of the considerable compensation for the owners on Sheppey.

With another inquiry about to take place, loose arguments and misconceptions—about any site—must not go unchallenged. After all, we are not talking only about airports : we are talking about people, whose whole lives might be changed by the final decision. That is why I feel bound to question the way in which your contributor has glossed over so many points of concern to Sheppey. People in Kent matter as much as people elsewhere.

Terence Boston,
House of Commons

Sir,—The letter from Ralph Covell in the March issue of your journal commenting on the article on the third London airport (*OAP*, January) indicates that the Foulness airport lobby is not yet fully aware of the many complex technical and planning issues associated with the location of a third London airport. I should like therefore to comment on some of the points made by Mr Covell in his letter.

1 "Sheppey has a 130° arc of flight over water whereas Foulness has a 210° arc". Arc differential does not alter the aeronautical feasibility of aircraft stacking over the North Sea at both sites.

2 "Foulness has better visibility than Sheppey". The visibility differential shown in Fig 4 of the appraisal article is so small that it is not statistically significant in terms of airport operational efficiency.

3 Mr Covell said that Foulness allows supersonic flight through north, east and south arcs (Sheppey through the northern arc

only) ; that supersonic flight is unlikely to be permitted within ten miles of any land mass.
As runway alignment at both sites would be north east/south west, supersonic vehicles would take off into the prevailing wind towards the south west. If supersonic flight is banned within ten miles of the nearest land mass, only the north east quadrant would be suitable for supersonic flight from both airports. Supersonic flight ten miles after take-off from Foulness through the southern arc would subject Queenborough, Sheerness and Minster to sonic bombardment. The fact remains that supersonic flight from both coastal sites would be possible sooner than from land-locked airports at Heathrow and Stansted.
4 Mr Covell further argues : Short haul fights—east and south east—account for 61 per cent. of all flights. Of short haul flights, 27.5 per cent. are neither longer nor shorter into Sheppey or Foulness. If landings and take-offs are allowed over Kent, 33.5 per cent. of short haul flights would favour Sheppey. If, *as the argument goes* (my italics) landings and take-offs are over the sea, then these 33.5 per cent. short haul flights will be neither shorter nor longer into Sheppey or Foulness. As to long haul flights, 16.5 per cent are more favourable to Foulness, the remainder will show no favour relative to either location.
These figures assume no overland flight from either site. In fact, although all landings would be from over the sea, west bound traffic from both airports would overfly Kent and Essex unless air carriers agree to route this traffic over water *via* the north of Scotland and the English Channel—a doubtful proposition for economic subsonic operation. Given overland operation, the Report of the Stansted Inquiry states : "a site in the south east will show the shortest air mileages for the largest number of flights and the least interference with traffic flows". Geographically, Sheppey is more favourably located than Foulness for optimisation of transport economies of scale in the south east quadrant.
5 "The airport proposed at Foulness is to be on recovered land (from the sand banks and the sea). *The country zone would remain* (my italics) and act as 'a sound buffer zone' between the airport complex and the residential areas proposed (extension of Southend and Shoeburyness) and the growth sector".
It has yet to be proved that major reclamation of land east of Foulness by construction of extensive sea walls, will not drastically affect the existing estuarial tidal pattern with, as yet, unknown effects on navigation channels, the existing coastline and floodwater height in the River Thames.
A sound buffer zone three to five miles from the perimeter of a major airport may be justified socially and economically. Beyond that limit, all that is necessary to stimulate development is to cut the tape across the first runway. To preserve the country zone west of Foulness shown in the map of the South East Strategy, it would be necessary to impose draconian planning restrictions on development in an area stretching from the perimeter of the proposed airport at Foulness westwards to Hullbridge—a distance of 14 miles! Experience at O'Hare Chicago and Heathrow London shows that once airports open to traffic it is impossible and not even desirable to restrict development. Positive regional planning is the essential prerequisite for airport location and development. Once open to traffic, London III must be fully exploited as a revenue earning asset, creating job opportunities for thousands of people within a 30 mile radius, whose spending power creates the base for sound commercial and industrial expansion in the region.
6 Another claim made by Mr Covell is that Sheppey has "moderately good farmland" and that the airport would have to have a country zone of similar nature to the proposed Foulness country zone.
The proposed airport at Sheppey stands on 12,800 acres of uninhabited marshland. The whole area could be bought, drained, and levelled off for a fraction of the £58 million required to reclaim 9,000 acres at Foulness. The recommended sound buffer zone at Sheppey ranges from 3 to 6 miles from the airport perimeter to the nearest centres of population.
7 "Thamesmead, 30 minutes journey from Sheppey, would be too far for the average airport worker to travel to work".
It is difficult to treat this statement seriously. In fact, many airport personnel at Heathrow live in areas as far away as south Oxfordshire. The rundown of industry at Woolwich and the development of Thamesmead for a population of 60,000 within 15 years, will mean that people will have to commute over greater distances to work. The GLC and Greenwich Borough Council are now investigating the obvious need for employment for the future inhabitants of Thamesmead. A major airport at Sheppey would act as an employment magnet, reversing traffic flows and relieving congestion on crowded tracks into London.
8 The Foulness report "did not propose a new town for 100,000 people. It proposed expanding existing towns such as Billericay, Wickford, Raleigh, Basildon and Southend, exactly the same kind of proposals for expanding towns around Sheppey, were it to be chosen for the airport".
Expanding existing towns is definitely *not* part of the Sheppey airport proposals. Economic specialisation stemming from airport activities requires the maximum concentration of population to (a) optimise demand markets from airport generated industries ; (b) increase labour markets ; and (c) encourage a wide variety of skills from these markets. The point made in the article remains valid. An airport at Sheppey would encourage urbanisation by drawing on existing and planned investment in North East Kent—an area already scheduled for development in the report of the SEEPC. It would represent a much better *overall* investment than either Stansted or Foulness, both of which would require relatively greater investment in infrastructure and new town development. The most expensive cost centres associated with airport development are the roads and outside the perimeter, in the form of roads, railways and new towns.
9 "It is difficult to see much of a case for a close or strong link between Paris [illegible] the Third London Airport. Ground traffic between the two is likely to be minimal".
In the 1980s, air cargo revenues will exceed passenger revenues. A new European airport must be designed to capture entrepot traffic to increase dollar invisibles from the blue riband trans-Atlantic jet cargo routes. Point-to-point transport involves more than just carriage by air. There is an urgent need for a systems approach to cargo, particularly when the Boeing 747 and the Lockheed Galaxy enter commercial service. Intermodal container services linking Sheppey and the Chunnel interchange near Ashford open up possibilities for air rail transport systems feeding high growth rate markets in North Western Europe.
10 Distances between Foulness and Sheppey to main transport nodes at Ashford, Paris Nord and Tilbury are "suspect".
Table 3 in the appraisal article makes it clear that distances are approximate. In each case the benefit of the mileage is given to Foulness.
11 "A tunnel under the Thames would not be essential to an airport at Foulness and it would be quite misleading to set a sum of £80 million against the investment needed to make Foulness viable as a site for the airport".
An integrated infrastructure could be planned and built linking Thamesmead, the "Chunnel" interchange at Ashford and Sheppey airport, all on the south bank of the River Thames. This would represent a more cost effective transport investment than splitting the infrastructure between Foulness on the north bank and the "Chunnel" on the south bank. The Foulness report states : "If the Channel Tunnel materialises, then it could be advantageous to build a supplementary tunnel under the Thames estuary to provide a direct link

with Essex and Suffolk, its route being Dover —Canterbury—Milton Regis—Sheerness—Southend, incidentally serving Foulness airport". The appraisal article in *OAP* suggested that an airport at Sheppey would obviate the need for such incidental expenses. *If* there is to be an airport at Foulness and *if* it has to be linked to the "Chunnel", which seems probable, then it will cost the Exchequer at least £[illegible] million—for a road tunnel only.

12 Table 2 in the appraisal article is "misleadingly and mischievously incomplete in that the cost of land acquisition at Stansted and Sheppey has not been included. Furthermore the loss of agricultural land at Foulness there is no loss of agricultural revenue (£2 million)".

The cost of land acquisition for an airport and the loss of its agricultural revenues are two facets of the same loss and cannot both be included. That is, they are mutually exclusive. Table 2 in the appraisal article includes the cost of lost agricultural revenues. To add to that the cost of land acquisition would be double counting, resulting in distortion of the true gains and losses at the three proposed airport sites.

It seems that Mr Covell has not completely assimilated the report on Foulness airport prepared by his own consultants. Paragraph 17.53, page 70 states: "At Foulness 9,000 of the 12,000 acres required would be provided by reclamation, and of the remaining 3,000 acres only about half are likely to be in intensive agricultural use—and then with a *net output averaging little more than* £50 *annually*" (my italics). On the same basis of calculation used to estimate losses of agricultural revenues at Sheppey and Stansted, the loss at Foulness would in fact be £2.25 million over a given 15 year period at current prices.

13 "There is great danger in accepting or forming conclusions on such a sketchy table—other cost benefit factors will have a significant bearing on both capital and recurring expenditures and a full cost benefit exercise needs to be undertaken before readers are (mis)led towards wrong conclusions".

The article stated that the estimates in table 2 "do not claim to be exact" but that they do illustrate "the likely *order* of long term capital expenditure which would be incurred at whatever site is finally chosen at the third London airport". One looks in vain in the Foulness report for even a "sketchy" table of capital cost estimates. In capital analysis of alternative schemes the list of costs should be exhaustive as possible. Gains and losses common to all three airport schemes should be left out, since it is only the *differences* between them which influence the final choice. For example, the capital cost of air traffic control equipment is the same for all three airports and may be left out of the calculations. In that much over-worked phrase, cost benefit analysis, cost is all-important. No matter how great the potential benefits, social, economic or otherwise, which a given airport scheme might appear to offer, it is not an economic proposition in terms of national resource allocation if the airport capital costs are too high compared to alternative schemes which offer roughly the same order of benefits.

Ian M Fulton,
Department of Economics and Business Studies,
North Western Polytechnic,
Camden High Street,
London, NW1.

Sir,—As a geologist and sedimentologist, I am not a frequent reader of your journal. My attention has been drawn, however, to the articles and correspondence relating to the third London Airport (*OAP*, January and March), and I am concerned by the lack of appreciation of the sedimentological problems involved. The science is still young, though rapidly advancing, and we are not as yet able to give clear-cut answers to many of these problems; but at least we can be aware of their magnitude.

The Foulness site proposes to build up 9,000 acres of the Maplin Sands to some 22 feet above low water mark. At present both the rising and falling tides carry a considerable volume of water across this area; this will be per force directed wholly along the adjacent West Swin channel. The exact consequence of this is difficult to predict; it would certainly lead to an increased mobility of the existing sediment in this area, and this could result in sediment being swept down towards Sea Reach and thence out to the Oaze and the new Knock John Channel. It would be rash to say that this would or would not happen: but it is a clear possibility. Another possible effect is the southward shift of the West Barrow Sand, again having far-reaching consequences.

The authors of the Foulness reports assume that ample filling material is available, and that the process of its removal from the estuary must improve navigation facilities. I would question both those assumptions. Some dredged material is always available from the inner estuary, and an onshore site would be most welcome. But it would not be available in large quantities at any one time, and as it normally contains much "fluid mud", rapid compaction could not be assured. Excavated material from the Port of London's new Mucking Development would be more suitable; I do not know the quantities likely to be available, but I doubt if they would be anything more than a small proportion of requirement. Recourse would have to be made to the abundant fine sand of the outer estuary. It would be unwise to assume, however, that it could be taken from any part of the estuary without upsetting the delicate balance in which the present bank-and-channel system is held, and equally unwise to claim that it would produce a permanent improvement of the navigational channels. If the West Swin and its inward shoals could be converted by the scheme into a new deep-water approach this would be an important argument for the Foulness scheme but careful and prolonged study would need to be made before it could be demonstrated that this is desirable economics or feasible.

I am less concerned that the removal of this sand from the estuary would increase the risk of storm-surge flooding in London. The quantity of fill involved is of the order of 150 million cubic yards; the total quantity of mobile sand in the estuary has been estimated at 40,000 million cubic yards. These figures are so disparate as to make the suggestion seem at least unlikely.

I am also concerned with the possible foundation conditions at the Foulness site. Since this is a prohibited area my own research team has not been able to carry out any investigations, but I suspect that there is here only a relatively thin veneer of sand overlying reworked London Clay. This latter would be very mobile and the superimposition of the large load both of fill and other constructions could lead to disastrous subsurface movement. This is a naturally occurring phenomenon, for example in the Mississippi Delta where mobile mud has been squeezed away from the shoreline with the production of offshore "mud-lumps".

This is not to say that the alternative Sheppey site is free from problems. The proposition would involve construction on marine alluvium containing, as far as our information goes, substantial quantities of peat. This is of course by no means an ideal airport foundation. It is, however, fair to say that at least the problems at Sheppey can be more readily investigated and the solutions to them lie well within the field of established engineering practice. Whilst one is attracted by the imaginative and far-reaching proposals of Foulness, there are many problems which would need thorough investigation before it could be acceptable as a site for the third London Airport.

Dr J E Prentice,
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Strand, WC2.

Official Architecture & Planning

For the fourth successive year the 1968 editorial programme continues the important "Planning for People" series discussing factors which will determine the physical planning of Britain in all its aspects. Design criteria for the living and working environments will constitute the principal themes. Four of the issues will concentrate on services and studies of specific types of building development, such as mixed central area projects, hospitals, universities, schools and housing.

The programme will begin with a survey of recent and proposed urban redevelopment schemes indicating the future shape of central areas of towns and the changing pattern of the "high street". Housing issues will include three-dimensional studies of density, site suitability, housing types and traffic planning.

Design criteria covering such aspects as the treatment of visual externals, services and refuse disposal will be the subject of four further issues. Other subjects to be discussed in considerable detail will include the pattern of growth and change in the planning and building of universities. This issue will start with the premise that organisations are increasing in size and complexity, but are growing from initially small units. The origin of the problem lies in response to changing social demands on public building and changing economic factors in private development. This issue will be linked to another dealing with the hospital programme.

Two important new series will be featured during 1968. The first will deal basically with the subject of how technological developments at a detailed level can have consequences in terms of planning techniques at a policy level. This series, called "Technology and Planning", will discuss such problems as rationalisation of site services and the development of "closed" service systems.

The second series will consist of studies of small areas in towns and cities where opportunities for immediate physical change are limited, but where a reasonable balance between traffic and environment can be achieved without resorting to heavy expenditure.

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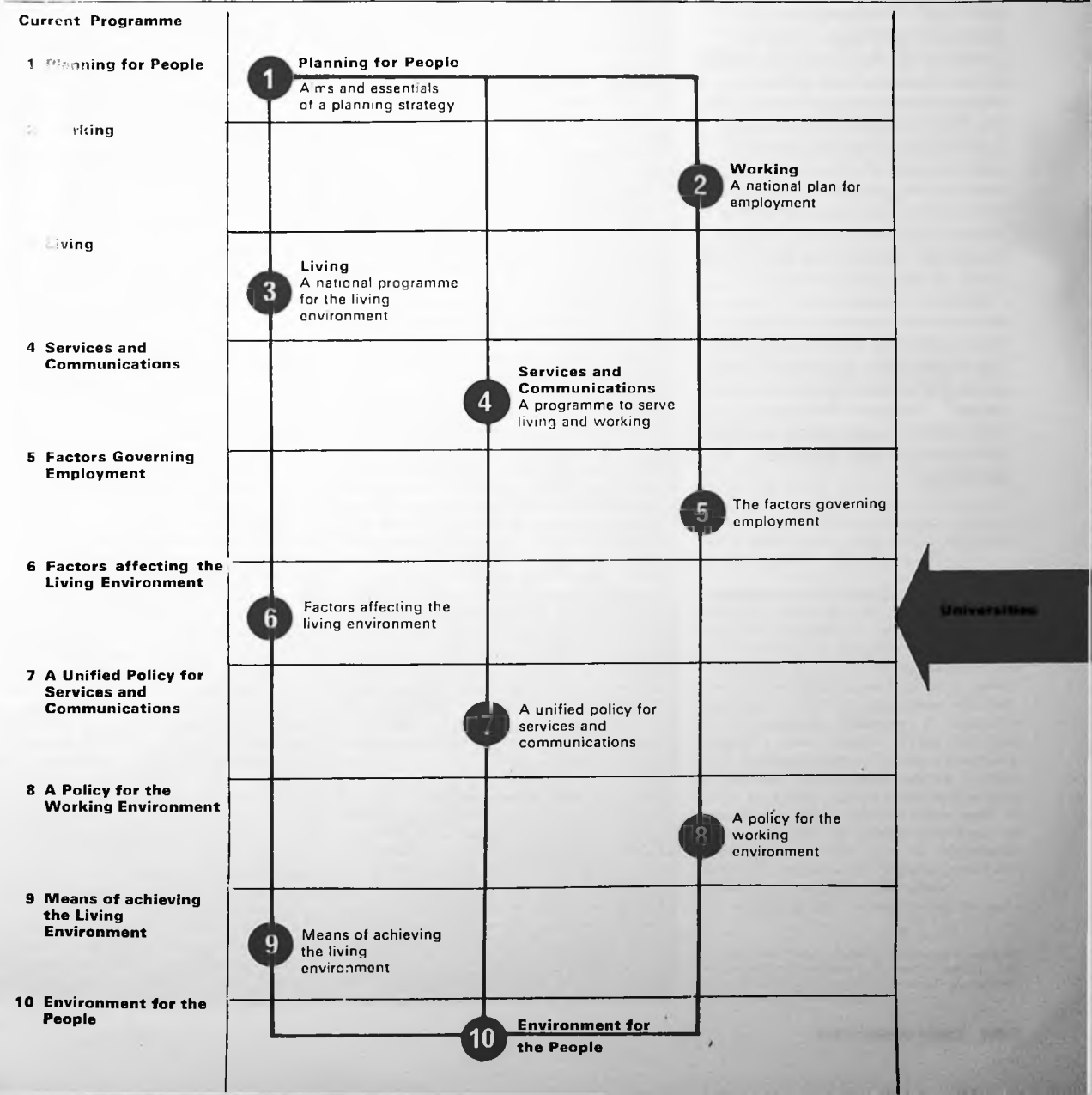


who was right?

The growing demand for places in higher education is putting enormous pressure on existing facilities. Now more than ever there is a need to make the best use of available resources in this field. The pressure of demand for places and the pressure of the changing needs of our society have obvious repercussions on university life. As fast changing institutions, universities must be planned with an eye on the future as well as the present. In this article Michael Cassidy treats these problems in the context of design, identifying the crucial need as the provision of a "balance between an environment which will last, be capable of effective use for many decades, and which will meet the requirements of initial users". He puts forward a number of suggestions on how this balance may best be achieved.

In Europe and the United States there has been a consistent increase in demand for facilities in education at all levels. This has been caused by population increase, by the higher percentage of each age group qualified and anxious to proceed to each next phase, and by the response to these pressures which nations have made in investing in their educational systems. Higher education responsible for the final direction, motivation and skills of graduates entering the professional world, has been under exceptional pressure to increase its facilities, and to change the content of its courses.

In Britain our interest has focussed upon the planning for entirely new campuses and for increased growth rates for existing colleges of advanced technology, now upgraded to universities. Although the growth rate for these new institutions has been extremely slow by American standards (few have more than 1,000 undergraduates, up to five years after inception) those responsible for academic and social policies and programmes were able to *think* ambitiously about the future. Ideas previously sacrosanct that universities with more than 3,000 undergraduates were unworkable and inhuman, for example (an idea which maintained mysterious concurrence for several decades) were seriously questioned. Much larger institutions were envisaged, with up to 15,000 students. Again, academic and social policies were re-examined and a variety of higher educational strategies were put into operation, offering students a wider range of options in the courses they could undertake. Clearly there was no agreement on what the *correct* pattern should be.

The economic crisis in Britain has had its inevitable effect upon the growth rate of university expansion, and it is an opportune moment to review the relation between universities as organisations, their plans for physical development, and the means we have at our disposal, or could develop, to evaluate their qualitative and quantitative achievements.

certainty and uncertainty

It would be misleading to suggest that all the pressures are for increase, and decisions finally affecting the quantity of higher education are always related to the amount of money available. This clearly makes projections of future student populations extremely hazardous; projections are seen in terms of statements of demand rather than expectations of fulfilment.

The overall uncertainty about academic and social planning for the new campuses is exacerbated by financial uncertainties. However, the university clients have been schizophrenic in their attitudes towards it—often supporting the general uncertainty while proposing with great conviction particular policies for their own contexts.

The awareness of uncertainty has not always been communicated to the professionals, or if it has, it has been ignored. This is not to suggest that the professionals were unconcerned about the future (they were, after all, commissioned to prepare development plans for various stages of their universities' development) but it is to suggest that their response to a future which could [illegible] only uncertainty was to ignore this [illegible] and propose finite non-adaptive [illegible] facilities. Of course at the inception [illegible] new institution, all concerned are [illegible] siastic and optimistic about the future [illegible] to base decisive planning strategies [illegible] infectious optimism is to evade a profess[illegible] responsibility for questioning the assumptions made—for worrying about the implications of alternative contingencies. It is as if the inevitable financial uncertainty would be diminished if the built form was proposed with certainty, conviction, and style.

But finance is only one of the aspects of university planning prone to change.

New campus projects have raised new questions about the essential relationships between the component parts of the university as a system in time. The tendency in planning has been to exaggerate the embodiment of particular socio-academic ideas in the new schemes—the over confidence and over certainty sustained by some of the administrators has been monumentalised in many cases, leaving the actual buildings less able to accommodate changes in those fundamental relationships on which there is no agreement. Even when the academics and administrators have been reluctant to form finite statements of academic and social policy, their architects have been unable or unwilling to consider the implications on development planning and have chosen to monumentalise their own interpretations of the brief. If the paternal collegiate system adopted at York or Canterbury in England, or the ruthless functional classification of activities used for Chicago Circle Campus, do not work, it will be extremely difficult for them to change to another kind of organisational structure, human adaptability notwithstanding.

The desire of many new universities to project a clear, unique and attractive image (to potential students and staff) may have contributed to the exaggerated physical dissimilarities between the campuses.

end-state planning—a fallacy

Because the British financial system for universities is both slow and peculiar, subject year by year to a range of economic regulating devices applicable to the whole country, plans for universities have to take account in a very real way of the uncertainty of the immediate building programme. This has complicated the planners' problem considerably because most of the schemes proposed were *end-state* designs—a finite statement of how things ought to be in 20 years' time or when an "optimum" population was realised. Growth was generally considered as a phased procedure towards the end-state. In a physical sense this has made it much more difficult for the compact "urban" plans to work during the first stages, which consisted of small, often separately let, contracts. Urbanist idealism is seen at its least effective in small quotations from "urban" schemes located in the middle of large rural sites. Paradoxically the loosely designed campus with isolated buildings or building groups (often accompanying less energetic and original educational policies) found themselves with easier building problems, and were able in a superficially seductive way to present an image of completeness at each stage.

The issue of contractual uncertainty underlines the general fallacy and irrelevance of end-state planning. We must accept that we do not know what will happen in the future of large complex institutions and concentrate upon permissive design strategies rather than those which will inhibit future development.

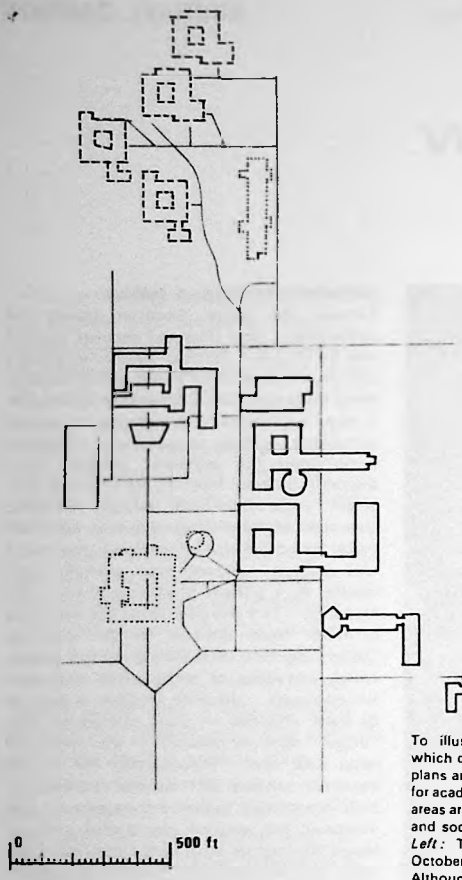
organisations in change

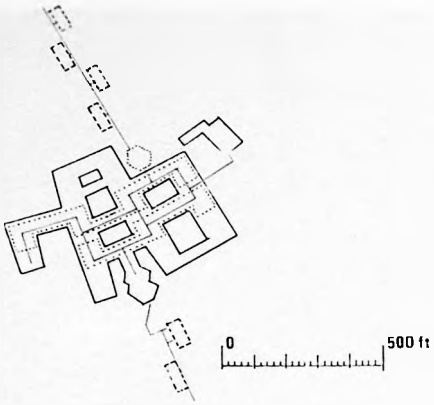
What are the aspects of universities which make the tendency to monumentalise the architect's brief so irrelevant?

Universities, like all formal organisations, are designed administratively to achieve certain objectives, to maintain themselves internally and to respond effectively to pressures impinging from outside. There are wide variations in the choice of goals, in the choice of methods for sustaining internal stability and in the choice of priorities for dealing with outside pressures. Choices within each of these topics are also subject to change, as modifications in the light of operational experience should be an essential part of any sophisticated administrative system.

The designers' role in responding to con-

An aerial view of York University, looking west, showing the disposition of buildings in an attractive setting. The desire of the new universities to project a distinct and clear-cut image is exemplified here



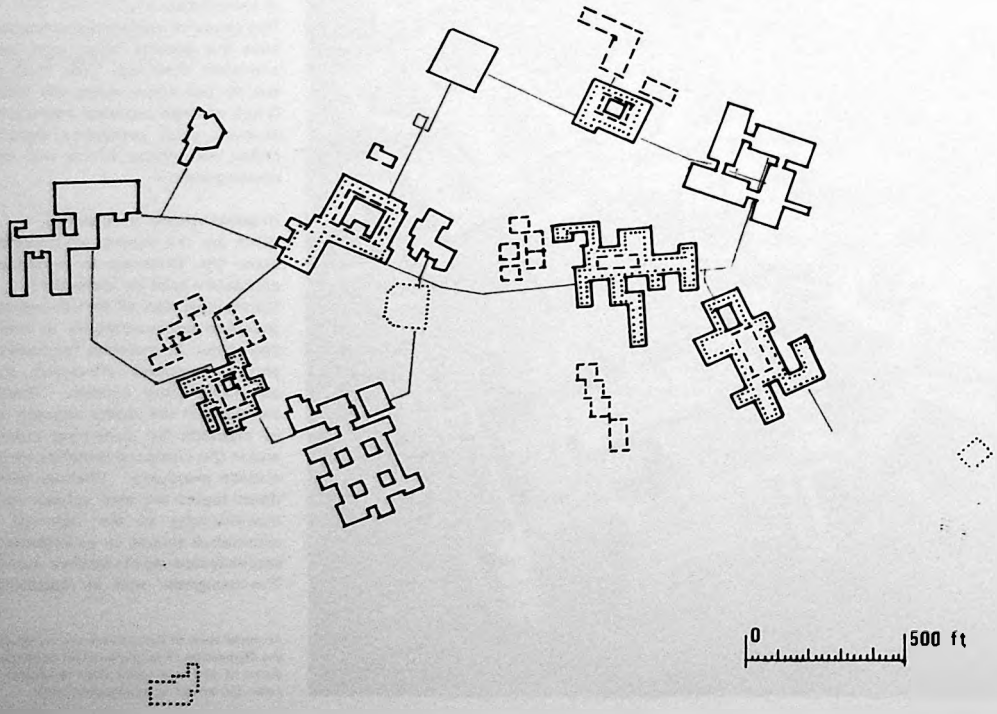


To illustrate the wide variety of physical patterns which characterise the new campus, three development plans are shown, to the same scale, separating facilities for academic, social and residential purposes. Academic areas are shown in solid line; residential, in broken line; and social, in dotted line

Left: The Sussex plan shows buildings completed in October 1966, and accommodates 2,000 students. Although operating schools of study, Sussex still has departmental buildings

Above: The tight urban planning of Essex represents one of the most coherently argued patterns of relationship between university facilities. It accords well with the distinction between public and private realms described in the text. The plan shown is for approximately 2,000 students

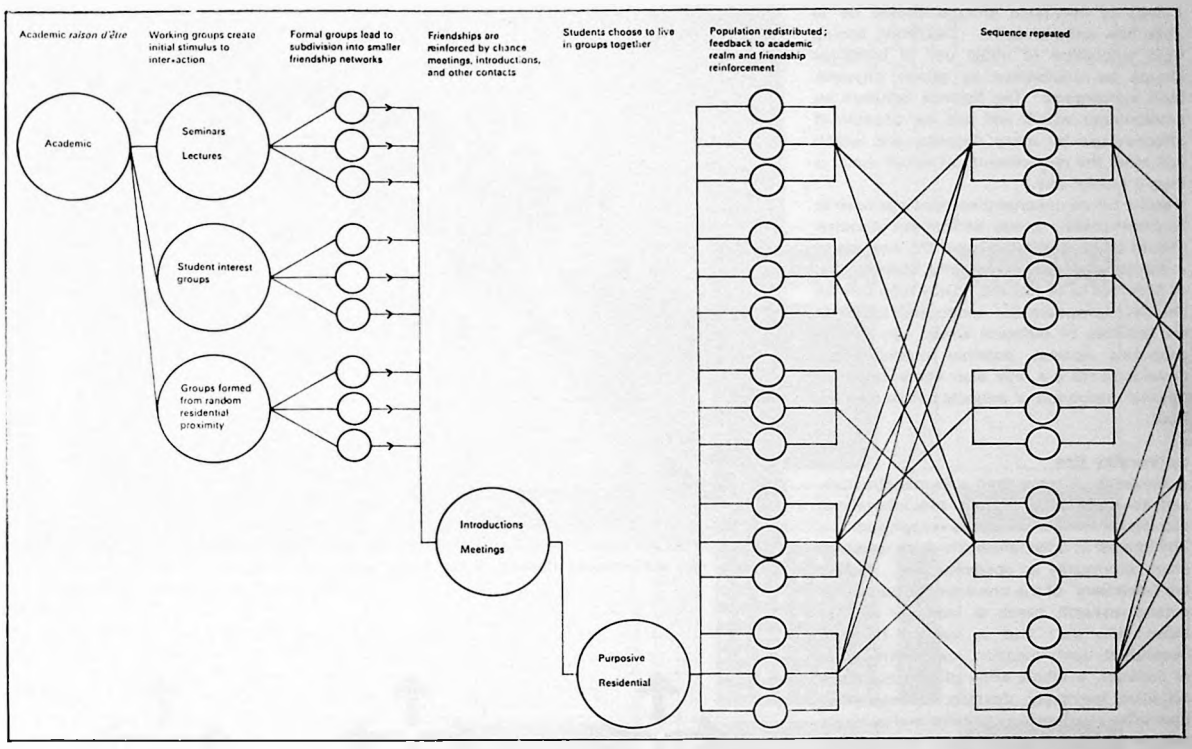
Below: The York plan illustrated would accommodate about 3,500 students (by 1973/74 approximately). Here, while humanities teaching is embedded within the colleges, science departments are dispersed

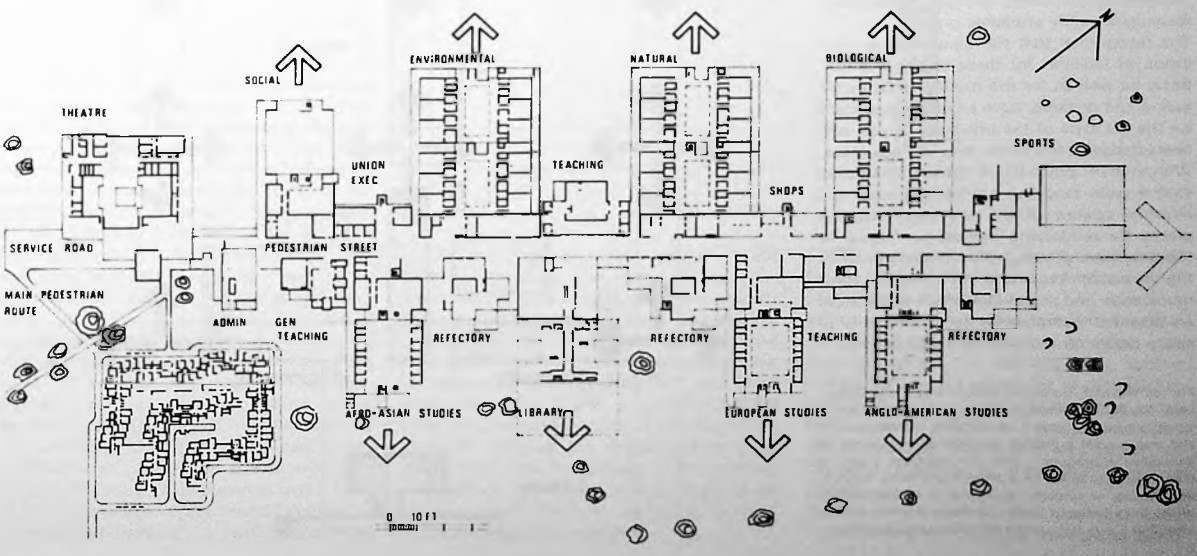


Below: The diagram shows how initial contacts arise from formal academic situations, to be reinforced by the informal associations generated by a community of interests. The population is thus distributed among a wide range of groups whose membership is constantly changing

Bottom: The design study arising from this diagram proposed a central street as a main communication route between university facilities, the place where people were most likely to see people they know, and thus reinforce friendships formed elsewhere as well as providing an information bank for events, facilities, and news. (Thesis project: Michael Cassidy, Louis Hellman, Robin Moore, University College, London, 1962)

The most serious fault with this project was the identification of separate schools of study. Although each is enabled to grow indeterminately, the relations between them are to some extent fixed by their initial location. What is needed is a looser locational system





ditions of inevitable change should be to keep the options open. Decisions arising from evaluation of initial use of buildings should be uninhibited by purely physical, built, constraints. The balance between an environment which will last, be capable of effective use for many decades, and which will meet the requirements of initial users, is thus a crucial one.

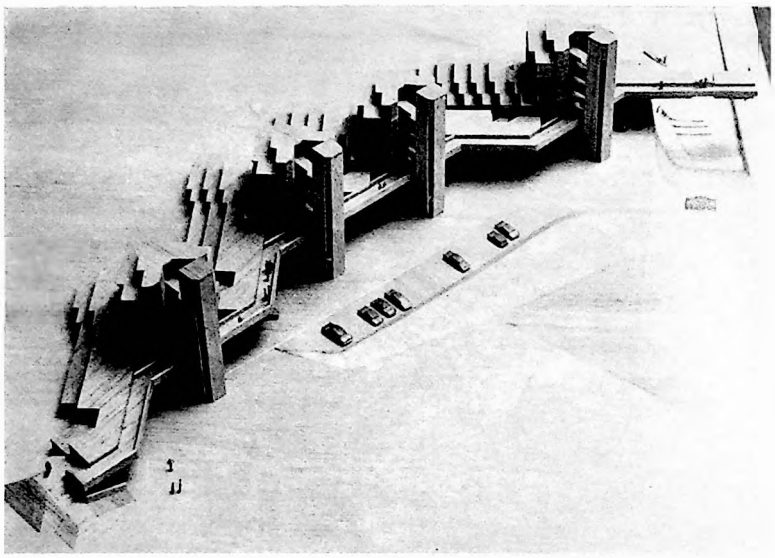
Despite future uncertainties buildings have to be constructed. It may be that our attention should be concentrated upon the analysis of organisational alternatives and classification of activities to be housed. Only then can we decide appropriate life spans and locations for facilities of different kinds. By testing proposals against possible organisational developments we may also come closer to rational evaluation of projects before they are built.

university life

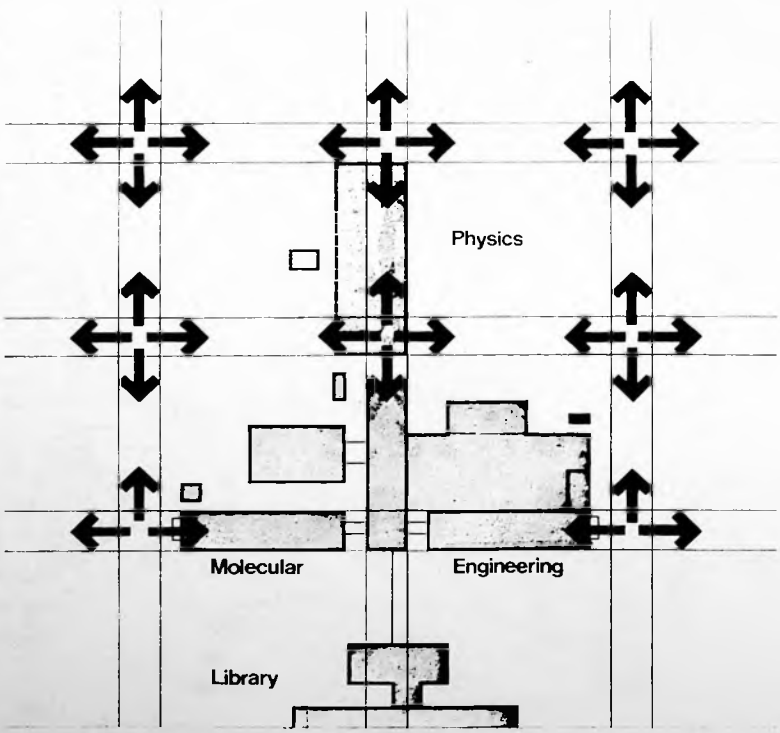
A university is more than a formal structure, and to understand it fully, the interrelated sub-systems within it must be recognised.

The interest in universities which all members share is primarily an academic one. People are "members" of the university because they pursue research, teach or learn, or support those who do. But in varying degrees, dependent upon location, catchment areas or facilities, a whole array of non-academic activities inevitably develop. These arise from other overlapping concerns and generate student societies, sports clubs, cultural and activist groups. The continuously changing membership of these groups substantially rearranges purely academic groups.

The recognition that the location and provision of facilities for these informal affiliations, as well as for the routine facilities for eating and drinking, have an enormous effect on the life style of the university in use, has characterised a few of the new campus plans. With student populations already distributed over a wide range of academic groups, the informal spaces of the university become places for reinforcing friendships formed in the academic groups. An understanding of the invisible processes of human communication and social interaction is therefore an essential complement to calculations of space needs for the projected populations.

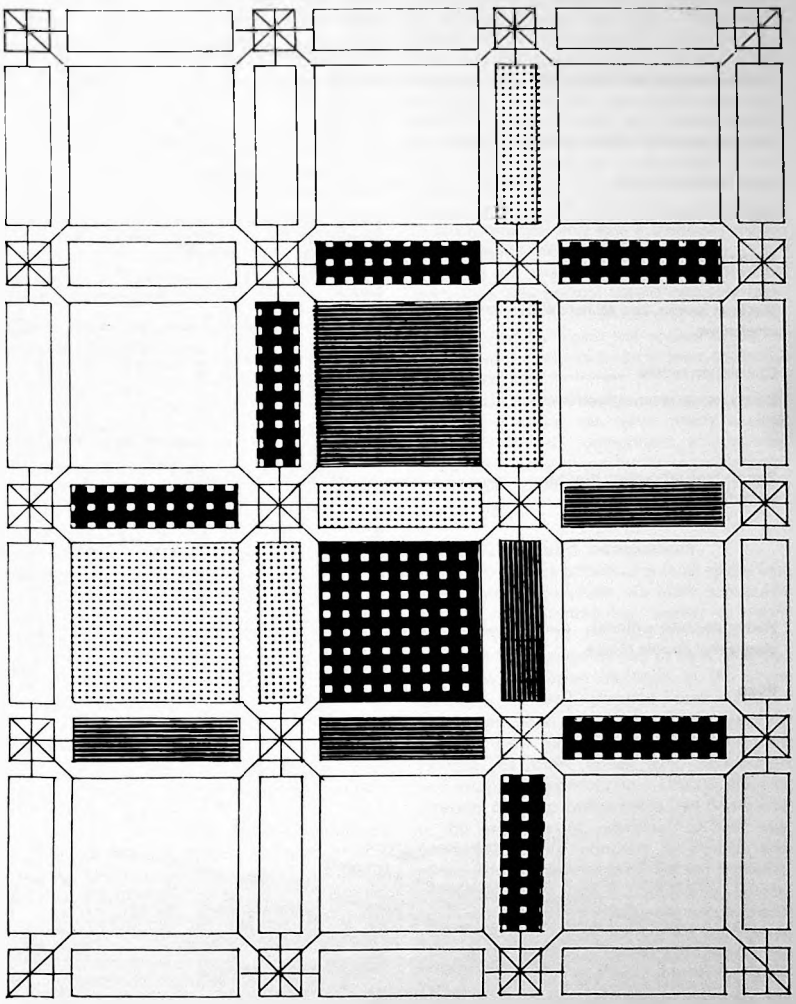


Residences, deck and undercroft, University of East Anglia, Draft 1



For the Warwick University science area Yorke Rosenberg Mardall proposed a diagrammatic grid pattern, which related to a spatial classification between neutral and non-neutral buildings, provides a wide range of alternative allocations. Thus the buildings could, in theory, be distributed to academic sub-units, schools, departments or subjects, according to an optimisation of the links between them. In three dimensions, it is clear that a very large range of patterns could emerge

Right: The notion outlined in the previous illustration provides the basis for a permissive communication pattern and a theoretical departmental connecting pattern is illustrated diagrammatically, different tones indicating different departments. Many other patterns are obviously possible



activities in the university

Most functional classifications of activities distinguish between those associated with residence, with academic work both teaching and research, with social intercourse with supporting services. These may be further reclassified as between the *public realm*, containing facilities for academic work, social interaction, physical support services and the *private realm* providing residential accommodation.

alternative patterns of facility relationships

There are large numbers of ways in which these could be physically distributed. An idea of the range of alternatives that might need to be considered can be gained by considering the existing universities, each of whose system could in theory be chosen by the others if it proved to be exceptionally successful.

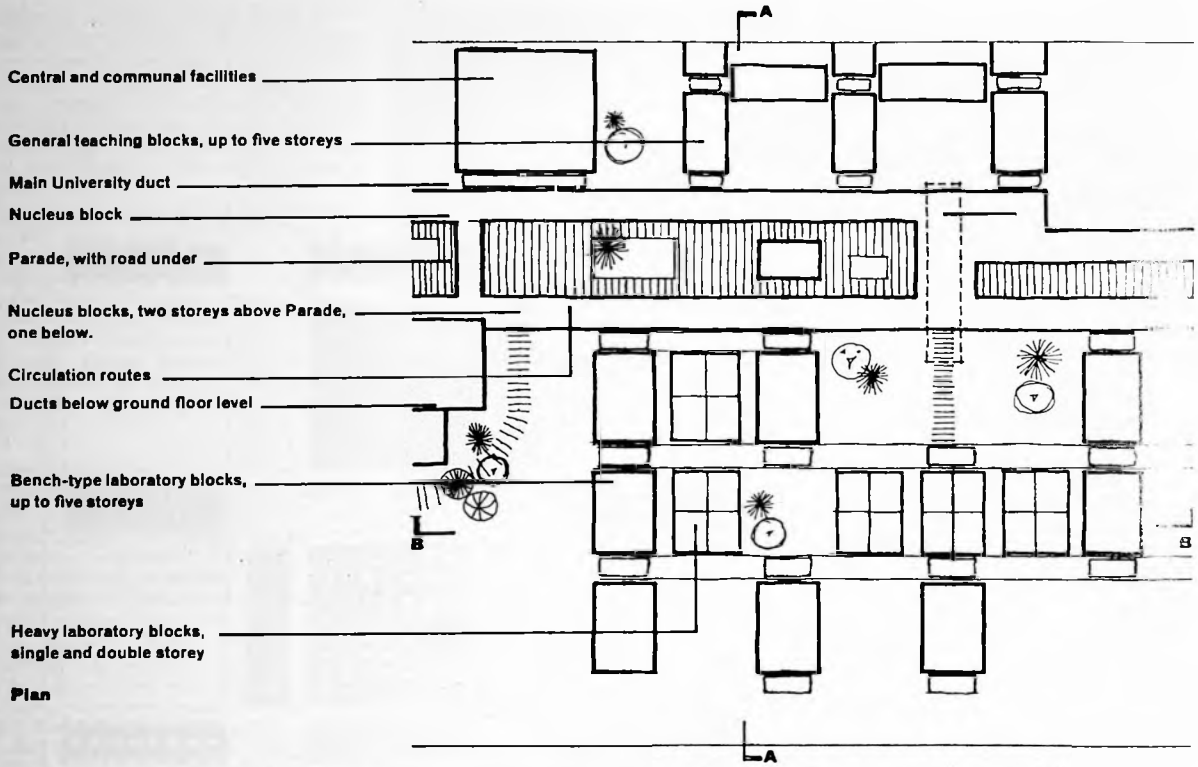
Academic policy may be affected by factors outside direct university control, as recently the UGC allocations have implied a reduced percentage of science students, as well as by changes from within. Each new staff appointment will want to have his say in the development of educational ideologies within which he will work (unless he has been chosen as agreeing already to the published policies). Outside factors like the research allocations, and inside factors like the personal relation between senior academics will play a major part in forming, and then constantly modifying, any educational strategy. This continual process of modification in the light of experience or in the pursuit of ambition seems a necessary part of the academic system. It should not be any part of the designers' brief to prevent or inhibit this machinery of change, no matter how confident and certain are the views of his particularised academic clients to the contrary.

Schools of study may become as obsolete one day as departments are sometimes regarded now. If a fixed percentage of top sixth formers have the right to choose which courses to take (as they do in California), the whole basis of class sizes, at present readily predictable at local levels due to restrictive competitive entry, is undermined and a completely new academic/administrative machinery would be necessary to reallocate existing space and facilities. How many of our buildings, let alone how many of our university administrators could accept and accommodate changes of this order? The physical implications of this are important, the traditional recourse of indeterminists, the identification of "departments" and their separation from a shared communications route, becomes itself an act of fixation, which although allowing the department to grow freely, fixes the department in its relations with others, and gives physical form to an organisational construct which is in itself subject to total reassessment.

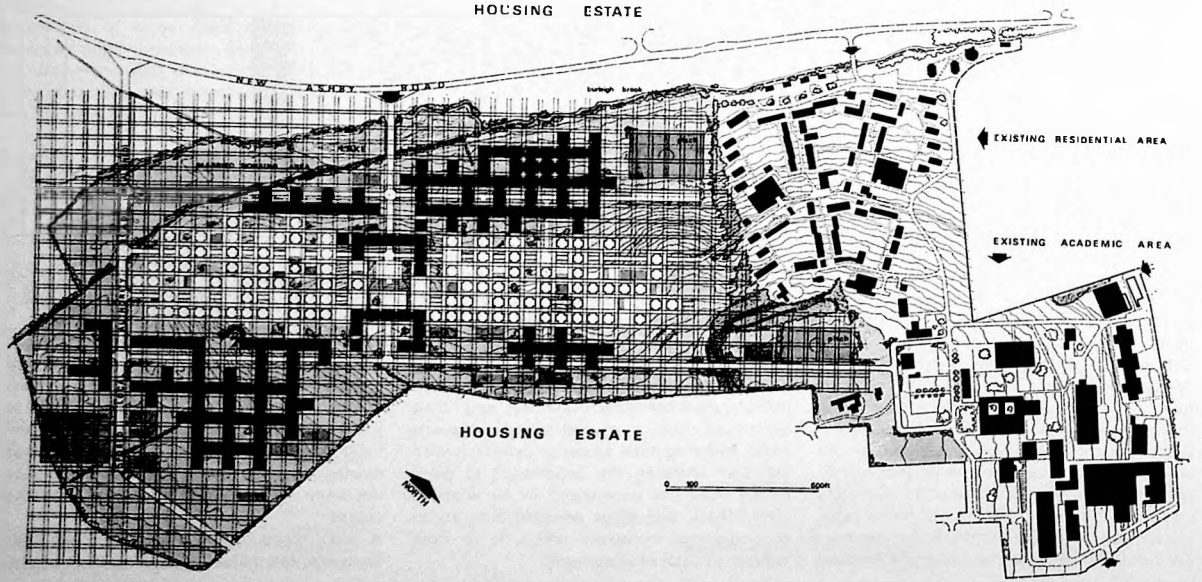
Similar alternative options may be described for the pattern of residence, and the pattern of public social facilities.

With the new universities, residential policy, particularly the allocations of sites for housing within the campus, was further complicated by the reluctance of the UGC to finance it. Thus universities relied upon local appeal funds to support campus residences, and clearly this was largely an unknown quantity in the initial planning stages.

A wide range of residence types has been experimented with, ranging from the student-


Central and communal facilities
General teaching blocks, up to five storeys
Main University duct
Nucleus block
Parade, with road under
Nucleus blocks, two storeys above Parade, one below.
Circulation routes
Ducts below ground floor level
Bench-type laboratory blocks, up to five storeys
Heavy laboratory blocks, single and double storey
A
B
B
A

Plan


HOUSING ESTATE
NEW ASHBY ROAD
EXISTING RESIDENTIAL AREA
EXISTING ACADEMIC AREA
HOUSING ESTATE
NORTH

Facing page, top: Continuing the linear theme with the open grid of neutral and special buildings, the University of Bath plan emerges with a coherent balance between coercion and indeterminacy

Bottom: A more open pattern still is provided by the plan for Loughborough University, although the derivation of the master grid may prove unnecessarily puritanical in the long run. This sequence illustrates very clearly the tendency towards open-option planning strategies. The future will rely heavily upon our ability to use the flexible plans, and this should lead to the replacement of our apparent concern for the imagery of the physical product by a concern for quantitative evaluation

ian towers of Essex to the collegiate "communities" of York, Lancaster and Canterbury. [illegible] particular type emerges as more [illegible] than others it may logically expect [illegible] option—but the apparent rigidity [illegible] ential patterns built so far suggests [illegible] time any serious evaluation of the [illegible] is published, it will be too late, [illegible] will be set, and the mistakes [illegible] perpetuated.

This is particularly the case with those systems where some parts of the public social facilities, eating, drinking and student society facilities are intermixed in finite communities with residential accommodation. There was more than enough evidence that such systems were doomed, even before the new university planning started, and with the accelerating demands of students for less autocratic and formalised control of their private lives these are high on any obsolescence systems schedule. How could we disengage the public from the private inside the colleges?

growth not understood

Thus the public and private realms are subject to organisational change. These changes could be required in an organisation not subject to growth: how much more pertinent are they when the condition of growth, at largely unpredictable rates, and in unpredictable directions, is introduced. The very fact of growth enables and demands that the preceding facilities should be evaluated to see if changed strategy is relevant.

In common with other large institutional complexes, universities exhibit characteristics of growth which must be examined if we are to understand how the facilities we provide will be used. Rather than analyse how buildings have failed to accommodate growth and change in the past, which is all too clear, it is more profitable to speculate on alternative strategies for meeting these demands in the future.

Some facilities need to grow as population grows and can be predicted as accurately as the population. Catering and rest room facilities are in this category. Some areas need to grow by the accretion of a complete unit of a particular size essential to its function, eg, a gymnasium or a theatre. Some areas may want to grow by taking over adjacent territory, office areas may be changed into laboratory space. Some areas may wish to vacate a given location and move to one which will allow them greater space for future expansion, eg, a large scientific research project becoming an institute at the edge of the campus.

Various combinations of these areas and locational aspects of change are typical of large organisational processes and have to be allowed for at the outset of planning. The design problem in open option planning becomes the identification of elements which will retain their usefulness independently of the organisational variations which might occur. Traditionally the commitment or "fix" of the building was the fabric itself, inert and often impossible to modify, but changes in technological capacity and in design outlook have loosened the hold that our current environment has over future human needs. Sometimes a communications grid may be fixed; sometimes, a "universally" useful environment may be fixed; and many more technologically innovative strategies have been suggested, with particularised mobile environments specially made for particular human operations.

university activities

This brings us to the central questions: what kinds of space should be provided, and how should they be related.

The classification of activities to determine space standards and the delineation of a communications pattern emerge as critical design activities. If we take for granted the desirability of building complexes responding realistically to changing requirements, priorities and demands, the spaces and the links between them are where the changes will be accommodated or prevented. We have seen that the traditional end-state development plan is necessarily unrealistic as a predictive design tool, that development ideas unaccompanied by continuing evaluation procedures may inhibit rather than enable university development. Our concern now must be to look at attitudes towards activities and connections that will stimulate creative university management.

Generally, architects for university buildings have been confronted by a previously compiled schedule of requirements, listing basic room services and other facilities. Thus there was no alternative to identifying "departmental" buildings as aggregations of uniquely related activities. Those concerned with the initiation of the new universities had the opportunity to look at the full range of activities, their aggregation within the units of academic and social organisation, and the physical and environmental demands they each make.

They could investigate alternatives to the *ad hoc* indeterminacy of departmental identification by examining the degrees of overlap in environmental and space demands made by apparently incompatible activities.

Provision of space able to accommodate more than one activity would certainly take account of the known propensity of complex organisations to regard the spaces available to them quite independently of their originally designated use.

Activities, like teaching, eating, pursuing scientific research, etc, have clearly a local "physical demand" component, a locational component determined by its organisational connections, and a "proneness to change" component.

physical demand component

The many factors influencing local space and environmental provision are often scheduled on *pro forma* schedules, similar to room loading sheets in hospital planning. The ability to make sensible use of data recorded in this way is often inhibited by the sheer quantity involved—detailed user requirements identified too early in the planning process can operate against a reasoned balance between initial user satisfaction and long-term satisfaction. Classification of physical demand components can be by size or by environment. Several of the new universities have adopted a simple and effective physical classification by choosing a particular size building envelope, seeing how many activities it can contain, and locating those which do not fit in another series of buildings specifically suited to special needs. Thus the neutral building emerges, satisfying immediate demands by variation of service and environmental facilities within a fixed building fabric.

This approach assumes that adoption of a structurally consistent envelope is a reasonable filter for human activities, and that the pay-offs accruing from the neutral envelope outweighs the separation of neutral and non-neutral activities, however closely they are functionally related.

Another idea underlying the neutral building is that the locational component of activities is much more flexibly defined. If activities are related to specific spaces in unique places, changes in the organisational pattern inform-

ing that location are difficult to make. By providing spaces with some facility for adaptation to other uses (ranging from label changing on the door to the complex service changes) the organisational unit is able to respond to local pressures to change. By providing aggregations of such spaces organisational units are enabled, as a whole, to vacate territory and move to other areas which may be larger or better connected to other units.

Thus all the procedures in design may be informed by a desire to create a physically fixable but organisationally flexible environment, within which priorities of activity aggregation, location and connectivity may be determined by whatever means the university develops, and according to whatever priorities are established at the time the rescheduling occurs.

connections in the university

As we have seen, many of the established major systems of connectivity and association between elements in universities have been examined and no single clear pattern emerges with guarantees of performance.

The physical solution is surely to avoid fixing any of the elements, but to provide lines of communication within which the location and context of individual spaces can be established according to the current priorities.

Several of the new universities have proposed quite rigid communications patterns, linking shared public facilities together and providing access to academic areas. The coercive patterns of human movement implied by these strongly linear schemes is based upon ideas about social interaction—that accidental meetings on a shared single route have academic and social pay-offs. The success or otherwise of these socially determinate schemes will provide much useful data on coercive social planning.

evaluation of institutions

Evaluation has two aspects of interest to university planning. First, there is evaluation of an existing institution in the light of its stated goals. Second, there is evaluation of projected physical plans.

The success of the physical environment is but one aspect of university performance. The success of the university, whose aims are not definable in simply quantitative terms, depends extensively upon the quality of the staff, the compatibility of administrators with those for whom they administrate, the range of external contacts, with industry and with the international realm of teaching and research sustained by staff, the quality of students, etc.

Each of these attributes is influenced in turn by others, similarly independent of the quality of physical environment, for example many universities have found that to attract good staffs they must offer good schools for their children near the university. The role played by the physical environment in this success evaluation has to be seen in terms of the various "special interest" groups whose overt desires may frequently be in conflict. A brief schedule of the interest groups would include: administration; staff teaching; research; students; and support staff (catering, technicians, etc).

If success is to be measured, it is surely to be done by identifying satisfaction levels in terms of the expectations of each group—and this can certainly extend to satisfaction levels for the physical environment. Within this framework dissatisfaction with the career opportunities in a particular discipline takes its place with the unnecessary distance between office or laboratory and dining facilities as indicators of a satisfaction level achieved for particular interest groups.

A major problem for architects anxious to please at least some of these groups is the management structure of the universities, which makes it difficult to identify the expectations of any but a small group of administrators and senior academics. The concern among students for a greater role in the management of affairs which vitally affect their "special interests", that is teaching methods, social and residential policy, is a good example of interest groups at work.

Identification of success by reference to interest groups deals reasonably with the qualitative aspects of the university, but surely there must be measures of quantitative success.

Of these the aspect now commanding wide interest, as a result of the Public Accounts Committee having access, through the UGC, to the accounts of individual universities, is the utilisation of physical resources. A long established inhibition to the effective use of facilities has been the departmental structure of most of our older universities, which has made centralised timetabling administratively difficult. It will be most paradoxical if the departmental structure gives way to more adventurous academic ideas because of purely economic considerations.

evaluation of plans

Planning evaluation has to do with projection into the future. We try to establish inevitable developments with the aid of routine statistical methods. We try to establish a performance specification for a project in both quantitative and qualitative terms, and then to establish a design to reconcile these two. But designs as built have very rarely had the effect upon people that our best intelligence had been able to predict, often because it is impossible to judge the implications designed for one particular set of requirements on a whole range of others not considered or known at the design stage. Our uncertainty about what is going to happen should be accompanied by a willingness to design into whatever we build the possibility of applying regulating mechanisms that take account of experience. The way that most contracts are managed makes this difficult. Professional teams very rarely maintain an interest in or influence over what happens when the users move in. Institutional buildings need complex administrative machinery which, given a responsive building, could fulfil the cybernetic role of monitoring growth changes and development in the light of the most up-to-date information.

Evaluation of plans for institutional buildings has two facets. The first concerns initial building needs usually precisely scheduled. We can ask simply whether the users are going to be pleased with what is provided, ie, whether the information given and the building proposed are in close accord. The second concerns the future. What range of changes, physical and administrative could the complex adapt to, do the scheme's fixed elements enable these options or inhibit them. A technique which could usefully be developed is that of the application of games theory. If a university is described in terms of the rules of a game, with an overall hierarchy established and with individual roles subject to influence from players in the game, sufficient simulation may be established to test a designed project. This procedure obviates the need to say whether the university plan is good or bad. It would enable us to say, for example: "if administrator A wanted to prevent department B moving off campus, he could do so by persuading department C to sacrifice proximity to the library".

A further device is for alternative schemes to be prepared, then subjected to a schedule of topics and graded comparatively. Theoretically one should be able to produce a performance specification of attainable characteristics by choosing the best aspects of each scheme.

The opportunity offered to study the many and varied physical, academic, and social patterns now in full operation must not be lost. Such study *will* be wasted if the new universities become as set in their ways as the older ones, and as some of their campus plans suggest.

a theoretical model

NICHOLAS BULLOCK, PETER DICKENS, PHILIP STEADMAN

One of the projects now in progress at the centre for Land Use and Built Form Studies in the Cambridge University School of Architecture could have far reaching effects on the planning of universities and on the basis on which funds are allocated for new buildings and equipment. The authors—Nicholas Bullock, Peter Dickens, and Philip Steadman—have worked on this project for the past two years; they feel that research is required to put university planning on a scientific footing and the development and use of a theoretical model similar to those being developed in urban planning. This article describes their work on the model; a report describing in more detail how the university model might operate is to be published in the near future.

In the context of present controversy about the structure of university finance, of Government concern about the efficiency with which universities make use of buildings and sites, and of university dissatisfaction with the present way in which funds are allocated for new buildings and equipment, a clear need is felt for a basis of fact upon which rational discussion of the use of capacity and resources can be built. In Cambridge we have for the past two years been studying the relationship of university population to amounts of building and to the use of land—working in a university context and with the help of the administrative and academic staff of a number of universities, but also in consultation with the University Grants Committee and supported since March 1967 by the Department of Education and Science.

What we feel to be necessary is a theoretical model of the physical planning of universities, a model similar to those used in economics and operations research, and of a kind now being developed, particularly in America, for use in the field of urban planning.[1,2] The essential feature of such a model would be the establishment of a comprehensive series of mathematical relationships between the different parameters which affect the physical aspects of university planning. These would be based, in the first place, on the mechanisms of university expansion as they operate now. "The simplest function of a mathematical model is to *explain*, in some sense, the present situation"[3], but shorn of many of the irrelevant complications that are always to be found in any actual case. Thus the model is primarily *descriptive*. The functioning of the actual system must be studied, and this we have done both for a large number of university buildings and sites and also for detailed teaching patterns at the London School of Economics and at the University of Newcastle. But once the model can be shown to represent adequately the relations of these variables as they are found, then its real value lies in its ability to predict, by the projection of the variables forward in time. Either it may be assumed that present trends continue, in which case the model is termed *predictive*: or else some variables may be controlled or planned, in which case it is called a *planning* model. Control of the variables may then be effected with some understanding of the implications of different academic, social or architectural decisions and their relation to the university system as a whole. In this way the failings of piecemeal planning can be avoided. A mathematical model of the physical aspects of the university would serve, therefore, not only to describe the present use made of buildings and sites, but would also supply more precise information than is currently available about their potential capacity, and about the implications in physical terms of the present and future expansion in student numbers. The demand for places will probably much exceed Robbins's 1963 predictions of more than 100 per cent. expansion by 1980. Despite the doubling of government grants to universities in the last five years, the demand for places continues to increase and there is, therefore, a great need for universities to use their accommodation more efficiently. In this context a "future state model" would supply evidence on which to base choices between urban, suburban and rural sites, to determine the effect of splitting the university teaching between different sites, or of separating undergraduate teaching from research, or to predict the amount of accommodation needed for new methods of teaching or new patterns of student residence.

Because of the mathematical nature of the model, and of the large volumes of numerical data involved, treatment by computer techniques is particularly appropriate.

dangers of sub-optimisation

There is in existence a body of information, considerable in bulk but largely uncoordinated, on university planning, accumulated by separate organisations, firms and individuals. The Architects and Surveyors Group in the University Grants Committee was set up "to advise the Committee on the universities' plans for individual buildings, and to develop systems of cost analysis which would provide norms, in the light of which plans could be assessed".[4] In defining its cost limits it has done considerable research into student residence, libraries, playing fields, catering facilities, and the use of prefabrication in university building. Much work of general application has been done by firms of planning consultants commissioned by various universities to prepare development plans. The Committee of University Buildings Officers has started to pool in a central information service the mass of statistical data in the possession of its individual members. Firms such as Ove Arup and Partners have made contributions to the theory of planning which have developed from their wide experience in the field.[5] Likewise, individuals such as J R B Taylor have made contributions in such areas as the science lecture room.[6] The list could be continued to great length; and a perhaps larger body of research done in the United States also has relevance for British university planning. The danger is that however many pieces of research are carried on, if they

a theoretical model for university planning

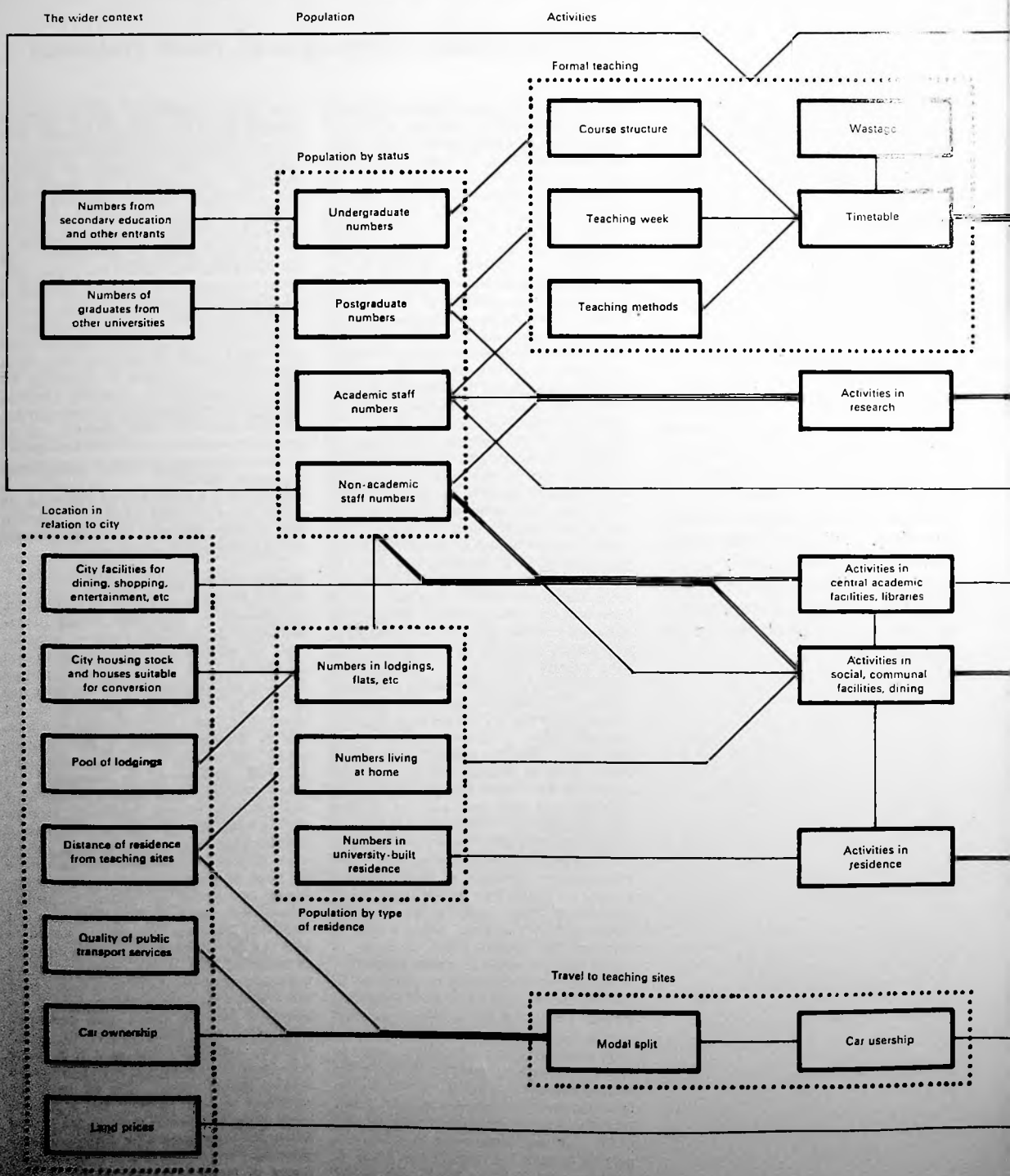


Fig 1—General network for the theoretical model showing, at a schematic level, how various sections might be related. On the basis of patterns of activity the model is used to calculate the amount of floor space required by the university. Alternative assumptions may be made regarding the intensity of use at which space is used and the appropriate standards of space and equipment

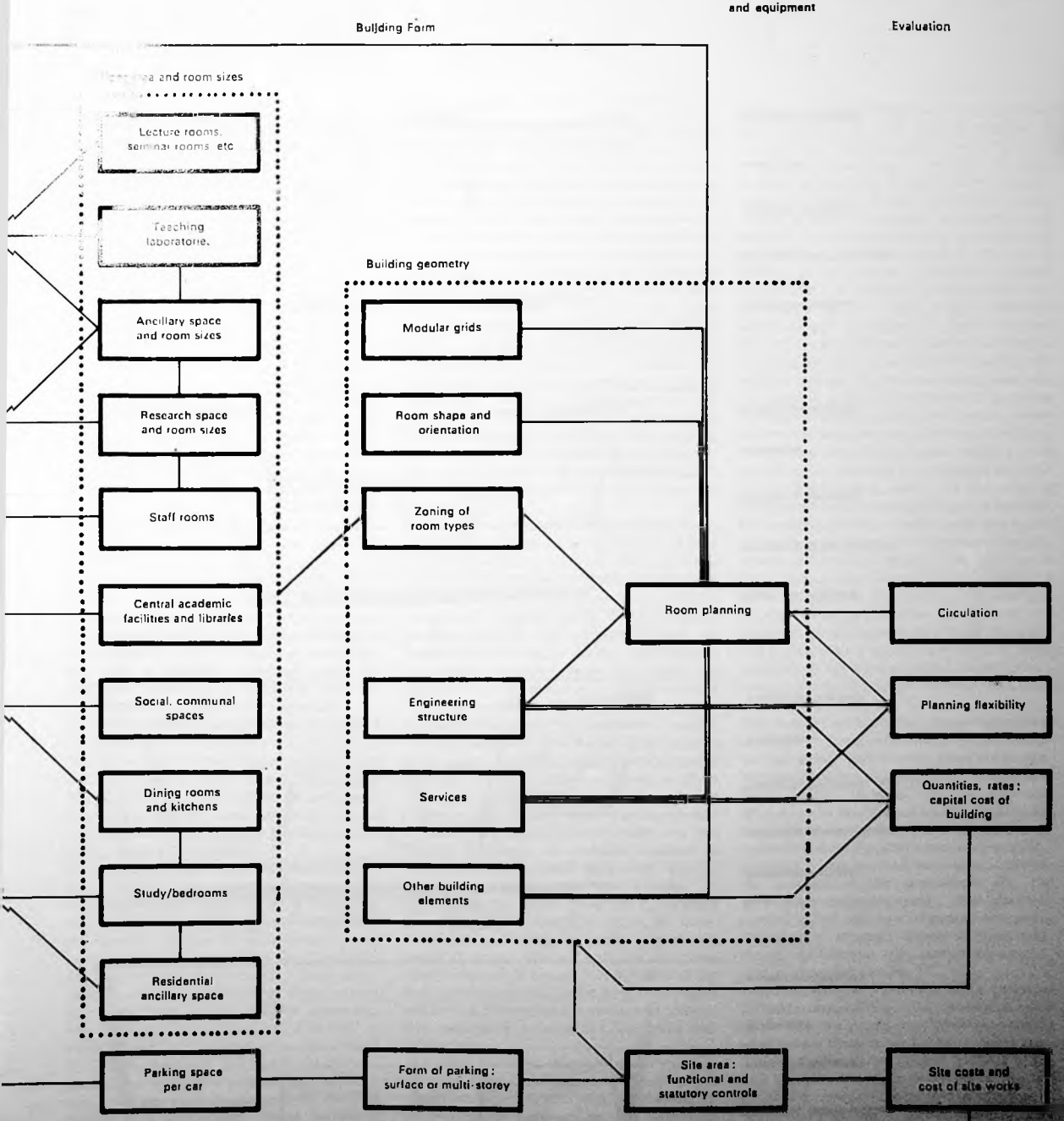
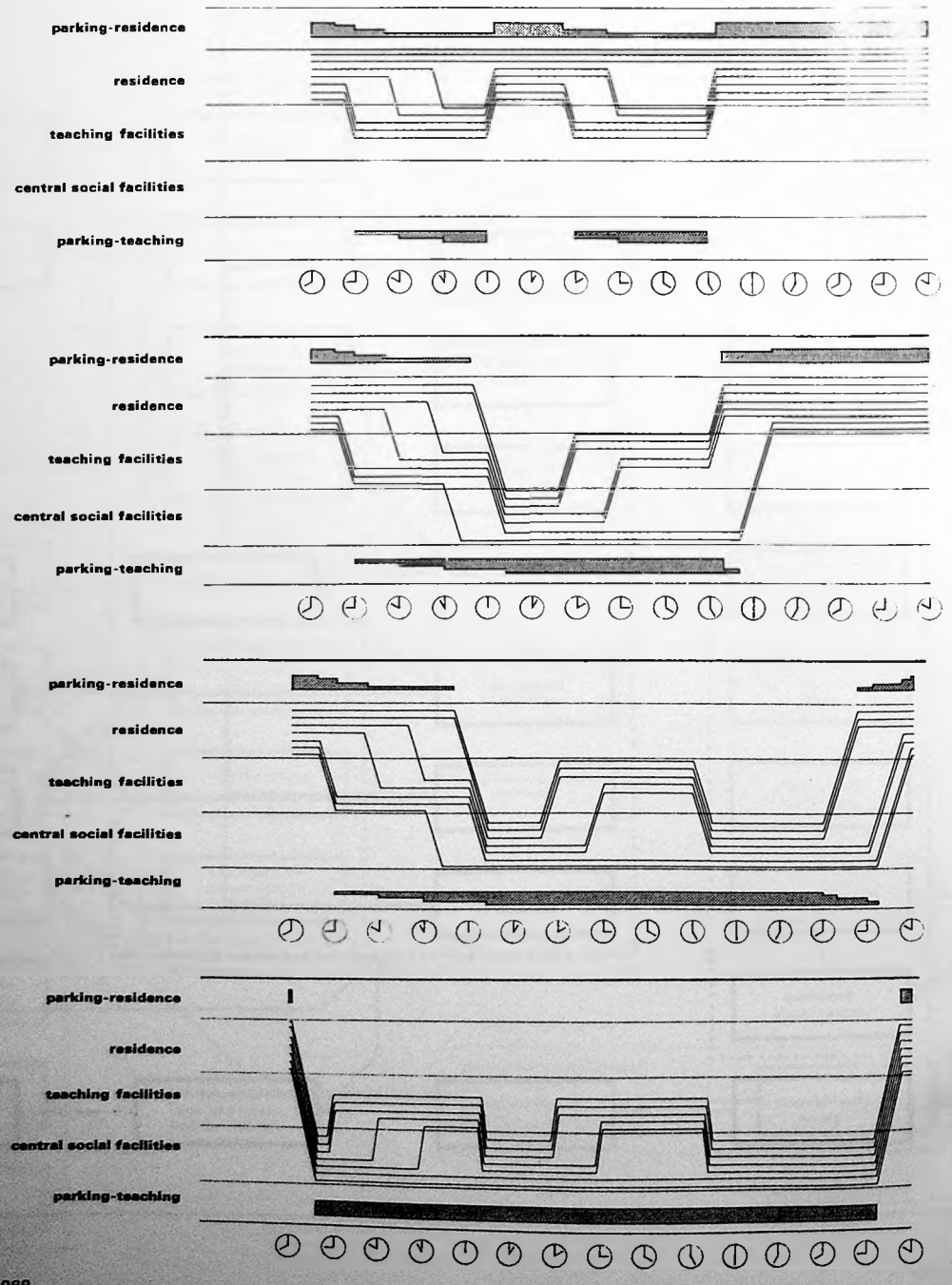


Fig 2—Activity patterns within [illegible] are affected by such factors as the time[illegible] of lectures and laboratory classes, the location [illegible] such as libraries and social areas and the dis[illegible] on the university's teaching and residential [illegible]



in isolation their value will be lost. Though perfectly consistent within themselves, they may fail to take into account the crucial effect of parameters outside their particular scope, and consequently be unable to provide the appropriate information for optimising in terms of the whole. Only by relating individual studies to the structure of their whole context can the universities become more efficient in their planning.

To take an example, the purchase of new building land and the capital cost of the building put on it are at present treated as separate transactions. So a high-rise or high-density building is subject to the same kind of cost limits (with some extra allowance for lifts, etc) as a low or spread-out building of equivalent floor area, irrespective of the consequent saving in land. Similarly capital and running costs are considered in isolation, as are the costs of buildings and the costs of staff salaries and equipment. One could imagine a situation in which a building, apparently wasteful in space, was nevertheless designed to allow a reduction in non-academic staff numbers, whose total salaries over the life of the structure constitute a sum which is large by comparison with the cost of the building. Again, great efforts might be made to cut down lecture room requirements by a re-organisation of the teaching timetable; but with a resulting increased need for laboratory space, which (student place for student place) is much more expensive.

It would be foolish to imagine that with limited resources and in a short time it is possible to treat in depth the whole range of studies which a comprehensive model would encompass. But we do feel strongly that the advantages of looking the broader view are sufficient to compensate for an inevitable sketchiness and inadequacy in some areas.

We should emphasise the important distinction between the generalised process of making the model (by defining the framework of the parameters and their relationships) and the specific process of formulating a plan to solve a particular problem (by giving the parameters particular values). Each parameter is allowed a reasonable range—at no stage are fixed ideal standards proposed. Nor is the model designed to "optimise" in terms of particular constraints (unless this is specifically required), but simply to demonstrate the effect of one variable upon another, and to outline the consequences of different decisions at each stage. These decisions, whether patterns of teaching or about standards of accommodation or amenity, are clearly the province of academic planners, university administrators, and the architects appointed

the model

It is beyond the scope of this summary to describe in detail the range of factors and inter-relationships in the model we propose. The "general network" drawing is intended as an index to the model and shows, at a schematic level, how various sections within it might be related. Some of the relationships are already expressed in mathematical form (particularly the timetabling of scheduled teaching periods) and it is intended that eventually all these links may be given numerical values. In the general network drawing, however, the type and value of these relationships are not specified : the form that these links might take is described in more detail later. The general network should not be confused with critical path diagrams in which a definite sequence or route may be taken through the network. In our case we may start by examining the relationships at any point and proceed in any direction on the diagram.

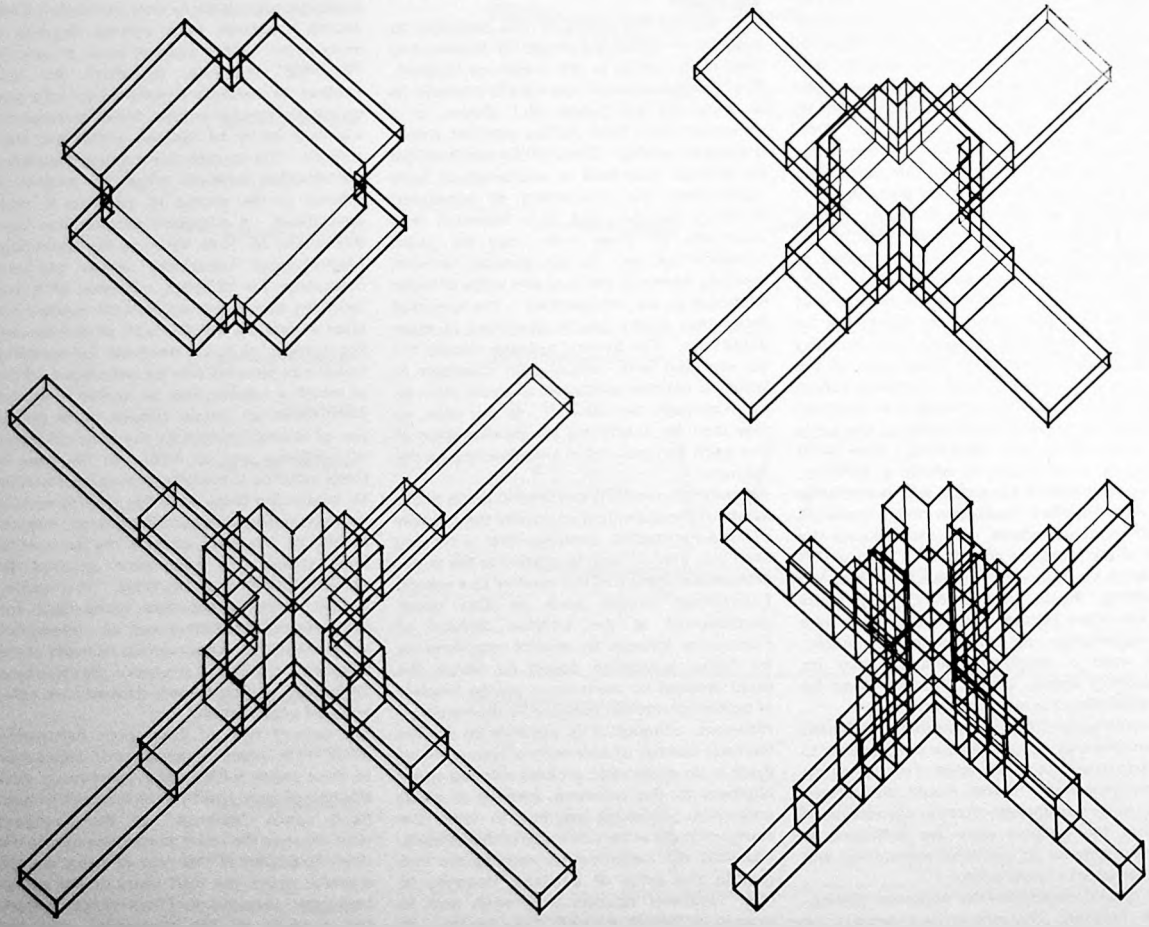
Although the model is couched in terms of the needs of the individual university the number of undergraduates entering the university each year may be seen in relation to the larger educational system of the country as a whole. Educational models such as that under development at the London School of Economics attempt to predict requirements for higher education based on either the likely demand by students or on the amount of trained manpower required by the country.[7] However, although it is possible to predict the total number of university places required there is no systematic process relating these numbers to the numbers entering a given university. Students are free to enter the course of study at the university of their choice. Likewise, the individual universities are free (within the limits of available finance) to offer whatever courses they wish and to expand to whatever size they decide. In considering the extent to which universities should have complete freedom in these matters there are important and contentious issues at stake. Without entering into these controversies it is hoped that a model of the type we propose may assist both universities and central government in evaluating alternative expansion policies for the individual university.

Assuming, therefore, that numbers of students studying different subjects form inputs to our model the first stage is to calculate the amount of floor-space required for the university population. This calculation may take three forms. The first involves consideration of activities in lecture rooms, seminar rooms, laboratories and other spaces in which distinct activities occur at fixed times.

academic organisations may be translated into course structures with varying degrees of complexity. Most courses have a typically "tree-like" structure, in which the total number of students is split down into progressively smaller groups, these corresponding to a series of options within the main subject. The courses may overlap, depending on whether a wide range of choices is offered or the course in question is more specialised. A computer program has been developed by P N Toye of the Cambridge Mathematical Laboratory which produces timetables for different patterns of formal teaching, taking into account the number and sizes of groups, the structure of courses and the number of hours available for teaching. Various constraints may be introduced—times at which a teacher may be unable to attend, fixed times for certain classes, limits on the use of rooms imposed by the physical layout of buildings and so forth. In the case of these patterns of formal teaching it is possible, by combining these activities with alternative space-standards and anthropometric requirements, to calculate directly the amount of floor space and equipment required for different patterns of teaching. This section of the model is therefore generalised and becomes an explorative tool for determining experimentally the appropriate intensity of use of space for different academic organisations, rather than relying on data derived from other types of organisation.

The second type of floor-space calculation relies on a direct relationship of population to floor space without the intervening possibilities of multi-use by more than one person. Such space "belongs" to the occupant who may use the room at any time during the day. Examples of this type of space are the research room, the staff room or the study-bedroom. Here the total floor-space is simply the product of the population and the appropriate space-standard. This latter will depend on the numbers of people occupying the space : research rooms or study-bedrooms, for example, may accommodate one, two, or more individuals.

The third type of calculation relies on broad statistical descriptions. This technique relies on surveys of existing accommodation and is used where there is no longer a direct relationship between the amount of floor space and the population or where it is not yet possible to simulate the pattern of activities as in "formal teaching". In, for example, pure science research rooms or ancillary rooms the relationship between population and floor space may be particularly complicated. Research in these subjects



activities themselves are subject to frequent change. This has been confirmed by a study of physical growth and change in two pure science departments. In these cases, therefore, we have depended on the analysis of survey data to calculate the amount of space required in each space category. This technique is limited to a purely descriptive role, and results may not be extrapolated beyond the confines of the existing situation. In other areas of the university, such as social facilities or the library, patterns of activity are, like those in scientific research and ancillary accommodation, much more varied than in formal teaching. But in these cases there is the added complication of tracing the effects of alternative locations on the use of these facilities. To overcome the limitations of the simplified statistical techniques used so far, and to account for other factors such as location, it is hoped to set up a probabilistic model of these activities to form a basis for the calculation of space requirements in these areas.

new patterns of teaching

The detail of the model as described so far is cast in terms of the traditional forms of university teaching, and of room types and uses as they are found today. How far is the model capable of treating changes in these areas ? Some changes would be more of degree than of kind, such as the four-term year, or teaching in schools of study rather than by departments. The model would not need serious modification to cope with these. But more serious structural alteration would be needed for instance to accommodate the widespread use of teaching machines, or of mechanical aids in the library. Likewise, the widespread use of closed-circuit television (located, perhaps, in the university's residential facilities) could have considerable effects on patterns of activity within the university and on commuter travel. Serious

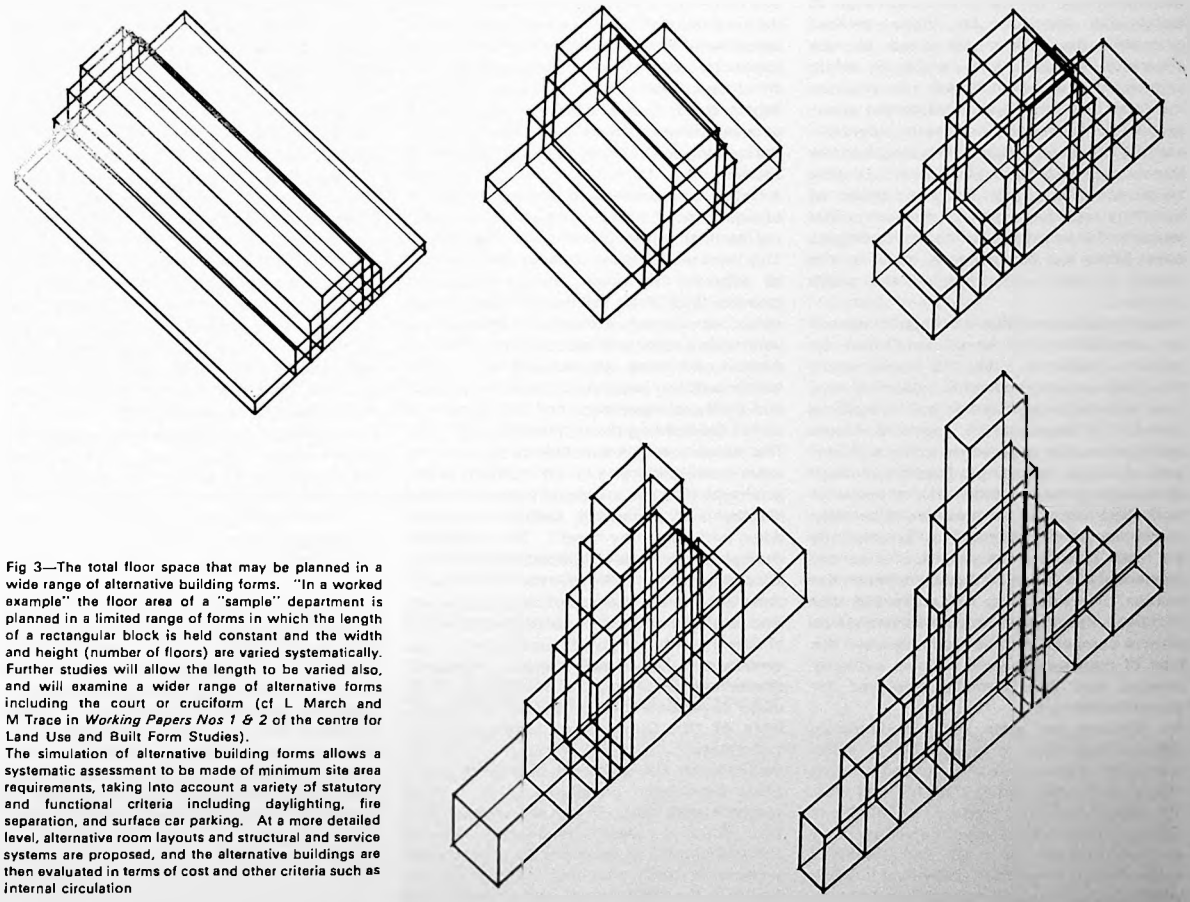


Fig 3—The total floor space that may be planned in a wide range of alternative building forms. "In a worked example" the floor area of a "sample" department is planned in a limited range of forms in which the length of a rectangular block is held constant and the width and height (number of floors) are varied systematically. Further studies will allow the length to be varied also, and will examine a wider range of alternative forms including the court or cruciform (cf L March and M Trace in *Working Papers Nos 1 & 2* of the centre for Land Use and Built Form Studies).
The simulation of alternative building forms allows a systematic assessment to be made of minimum site area requirements, taking into account a variety of statutory and functional criteria including daylighting, fire separation, and surface car parking. At a more detailed level, alternative room layouts and structural and service systems are proposed, and the alternative buildings are then evaluated in terms of cost and other criteria such as internal circulation

information on the detailed implications of such changes is hard to find, although American experience may provide indications. The speed of change is not so likely to be breakneck as to preclude a continual "up-dating" of the model to keep pace : indeed the massive investment in plant and buildings which the universities represent makes for a kind of inertia in the process of innovation.

Forms of building

The next stage is to examine the implications of planning the total required floor area in different forms of building.[8] Any kind of a tall order; but to demonstrate some principles involved on a restricted scale we have taken a single pure science department with a population of about 1,000 students and staff. While acknowledging the considerable economies to be made in the use of space in a centrally programmed organisation by comparison with a rigidly departmental teaching structure, and while appreciating the possibility of many kinds of physical organisation other than departmental—for example collegiate, or even at an extreme instance, as in the University of Illinois, the segregation of all rooms of a type in one building irrespective of discipline, ie, all laboratories in one building, all lecture rooms in another and so on—nevertheless we are choosing at this stage to isolate one kind of functional unit within the university, and for this purpose a department is manageable and typical. Using the techniques described previously, a schedule of accommodation has been prepared to suit a typical teaching timetable and making assumptions about teaching patterns, space standards and the under-use of different teaching facilities. These areas are *nett*, since the ratio of nett to gross (*gross* including circulation space, etc) varies with the actual planning of the building. T

tion have been limited to a small range of rectangular blocks. In these worked examples, the blocks are fixed in one dimension (length), but variable in width and height (number of floors). In all cases the total nett floor area remains the same, exactly similar accommodation is provided : and the buildings range from a single-storey structure of extensive plan area to a thin 10-storey slab. This limited number of buildings represents part of a much wider range, and the next step will be to investigate other forms by, for example, allowing the length to alter while holding the width constant.

A similar exercise to that on the pure-science accommodation has been carried out for student residence. In this case space standards and standards of construction have been systematically varied as well as building form. The variations in space standards reflect alternative approaches to the type and size of social groupings (traditional halls of residence, student flats, etc), the size of study-bedrooms and the provision of ancillary accommodation. Alternative assumptions are made regarding the provision of central communal and dining areas, dependent on the relation of residence to university and city facilities. Variations in construction standards allow a comparison to be made between the type of construction used in local authority housing and that normally employed for student residence.

By planning the same accommodation in different envelopes it is possible to make systematic comparisons of graduated building shapes from low and flat to tall and thin. The cost comparisons prepared by Monk and Dunstone are particularly interesting since quantity surveyors as a rule find it difficult to generalise in this way : individual building prices tend in practice to be idiosyncratic, varying with local conditions, the uncertainties of competitive tendering, different standards of finishes, and so forth. In our case the standard of finishes is varied systematically, ground conditions are held constant (so that foundation costs are comparable) and because the buildings are planned in detail the cost comparisons are realistic.

There are other comparisons to be made; for instance in the ratio of perimeter wall to floor area, and hence in the proportion of rooms with windows to internal "core" rooms. This has implications for the heating, lighting and ventilation of the building, and so for the running costs. Once the rooms are planned in detail, then the pedestrian circulation generated by the teaching timetable can be readily measured : a program has been written to do this for different plan layouts and patterns of teaching. Movement outside the timetable is difficult to predict although the probabilistic simulation of activities mentioned previously may assist in measuring this circulation. Peak flows, however, can be expected to occur with the changeover between lectures, and other movement around the building will be by comparison random and sporadic.

A further comparison is to be made in the use of land : ground area occupied by the building itself, then the use of surrounding land. This involves the study of the overshadowing of adjacent buildings using models to measure light levels in "rooms" opposite the model at varying distances. Surface car parking is a rapacious user of land : and the number of spaces required will be a factor of the building population, levels of student and staff car-ownership, and the pattern of use of the building throughout the day.

The simulation of alternative building forms, room distribution within the building plans, service layouts and structural systems forms a lengthy and somewhat tedious operation when performed "by hand". The number of examples that can be considered thus becomes extremely limited. Likewise the evaluation of these alternatives in terms of cost, circulation, land use, etc, may take a considerable length of time if a wide variety of possibilities is to be examined. For these reasons computer simulations of alternative building forms is under development in conjunction with members of the Cambridge Mathematical Laboratory.

Facilities for the graphical display of floor-plans have been developed using a PDP machine with cathode ray screen and light pen. Current research is directed towards the preparation of programs to simulate the process of room planning, leading perhaps finally to the "automated" planning of rooms within modular grid layouts according to a system of "bands" of rooms within a rectilinear geometry. Elaboration of these programs may include the introduction of further details of external and internal walls and doors, the position of columns, vertical circulation points and the positions of windows. Further research will also work towards the integration of existing programs for calculating structural members and assessing other criteria for building evaluation.

the urban scale

The final stage of the model comprises a rudimentary representation of the urban context of the university, showing the distribution of student residence throughout the town in relation to teaching and research sites, comparative land values (and rent levels) in different sectors, and the overall traffic network. Projections of vehicle ownership figures allows the prediction of the commuting traffic volumes generated by the university population (dependent on the patterns of activity mentioned previously), total university transport costs (to the community), and total car parking requirements. On this basis it should be possible to make comprehensive comparisons of the costs and advantages of locating the university's teaching of residential areas on different sites. As a start on this work, surveys have been made of the present distribution of student residence in a number of university cities : and for three selected cases, representing typical urban, suburban and rural situations, comparisons have been made of patterns of the "journey to work" and the "modal split" between private and public transport.

The model is not designed to represent a unique sequence of planning operations, and the process we have described above should be seen as circular and interactive. For example, the urban scale clearly has its effect on activities within the university's teaching and residential areas. The model could be used to assess the potential of a given amount of land or an existing set of buildings in terms of the number of students or the type of teaching activities to be accommodated. Finally, the model is seen as dynamic in the sense that increasing numbers of students, changing activities or alterations in space standards may give rise to requirements for additional accommodation or alterations to existing buildings. In this way the physical development of the university may be seen in relation to the many other academic and social factors involved.

references

1 *The Journal of the American Institute of Planners*, May 1965, gives a very full picture of American work in this field.

2 For an introduction to the use of models in planning, see *Architectural Association Journal* vol 82 no 911, April 1967 : Alan Wilson, "Mathematical Models for Planning".

3 ibid p 261.

4 University Grants Committee *Non-Recurrent Grants* HMSO, p 3.

5 *Architectural Design*, April 1967.

6 Jeremy Taylor, *The Science Lecture Room*, a report financed by the Nuffield Foundation, 1966.

7 cf C A Moser and P Redfern "Education and Manpower : some current research" in *Models for Decision*, ed D M Berners Lee, English Universities Press 1965. Also *Methods and Statistical Needs for Educational Planning*, OECD, Paris 1967.

8 For a description of the theoretical background behind these studies see : L March and M Trace In *Working Papers Nos 1 & 2* of the Centre for Land Use and Built Form Studies (forthcoming).

university of east anglia

The University of East Anglia lies on a south facing slope rising seventy feet from the River Yare, about two miles from Norwich city centre. The Development Plan provides for a total graduate population of 3,000, but if further growth is required, particularly in the field of research, the Greater University area on the periphery of the site can provide a framework in which this can take place. The Greater University, containing independent institutes and industrial research facilities, is an important element in the strategy to provide for the University's changing needs. The architects, Denys Lasdun and Partners, see the concept of the Greater University as "defining the physical relationship of the University with the city and the open landscape to the west".

The first draft of the Development Plan, which was prepared in 1962 before the appointment of academic staff, embodied certain basic principles which were to remain constant while the detailed working out of the plan could be done in the context of discussion with the University authorities.

These basic principles and their expression provide the board framework within which the Development Plant has evolved. The architects aimed to create a compact place where activities could merge and which would be sufficiently concentrated to provide all who lived there with a sense of identity with the whole. This objective was of course related to the policy of creating an academic structure for the new university in which related disciplines would be grouped into broadly based Schools of Study and which would contribute towards a unity of learning. Related to the provision of a compact university was the aim to benefit from concentration by preserving the natural landscape and keeping it distinct from the urban environment formed by the university buildings

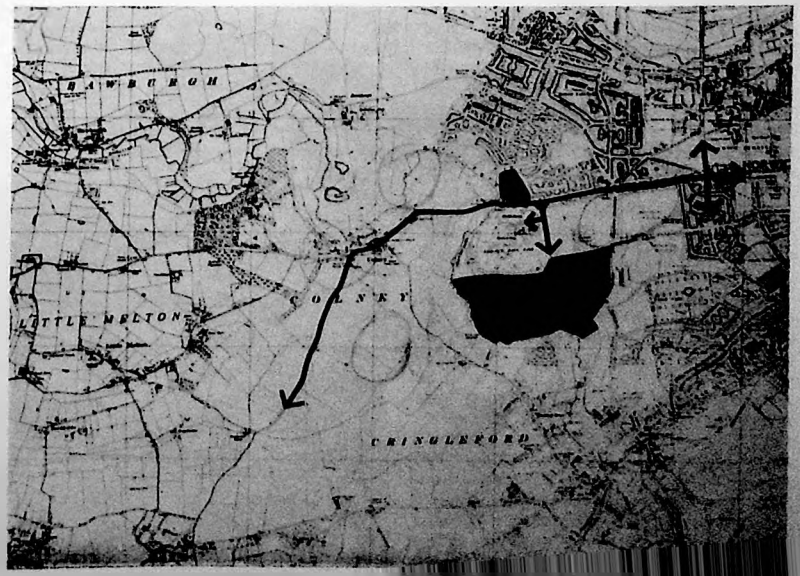
The residential terraces incorporate a system of *linkage*—routes holding a horizontal level against the natural slope of the ground. Buildings can thus be approached at one or more floors above ground, and pedestrian and vehicular movement can take place without one restricting the other. Parking can be dispersed over a wider area, and concentration of vehicles at one or two particular points is avoided.

With the intention of fostering small and socially cohesive groups, student accommodation takes the form of a series of social groupings based on a group of twelve study bedrooms round a breakfast room. These combine to form larger groups of between 50 and 70 around a staircase and games room which in turn form groups of between 200 to 500 study bedrooms.

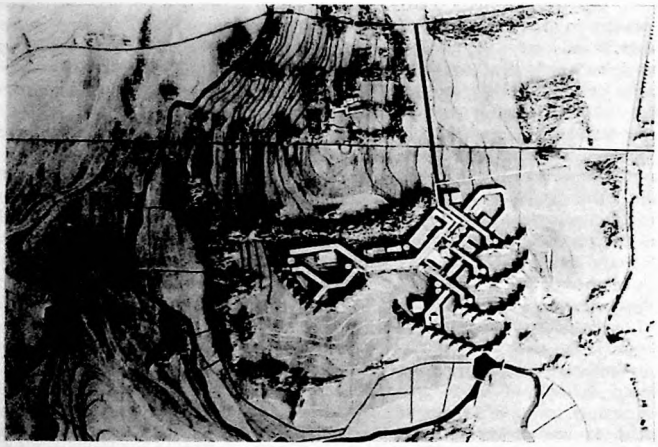
The teaching and research buildings provided for initially were the Schools of Chemical and Biological Sciences, and four Arts Schools. These were to be followed by Physics and Mathematics and Environmental Science. The aim was to achieve flexibility with economy and at the same time to allow each school to grow within a concentrated plan without having to move repeatedly in order to facilitate the expansion of others. The Library, which is seen as the heart of the University, is located near the main central spaces, in an area which is at once accessible and quiet.

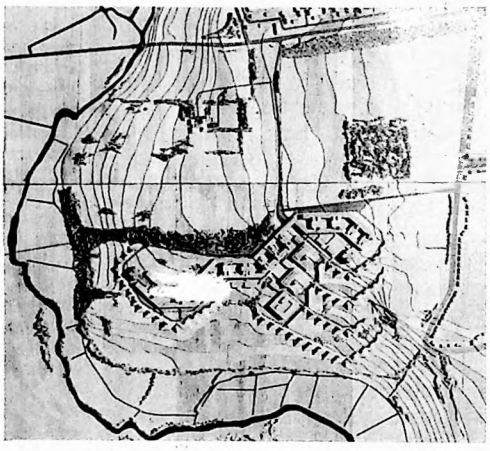
In the second draft of the development plan,

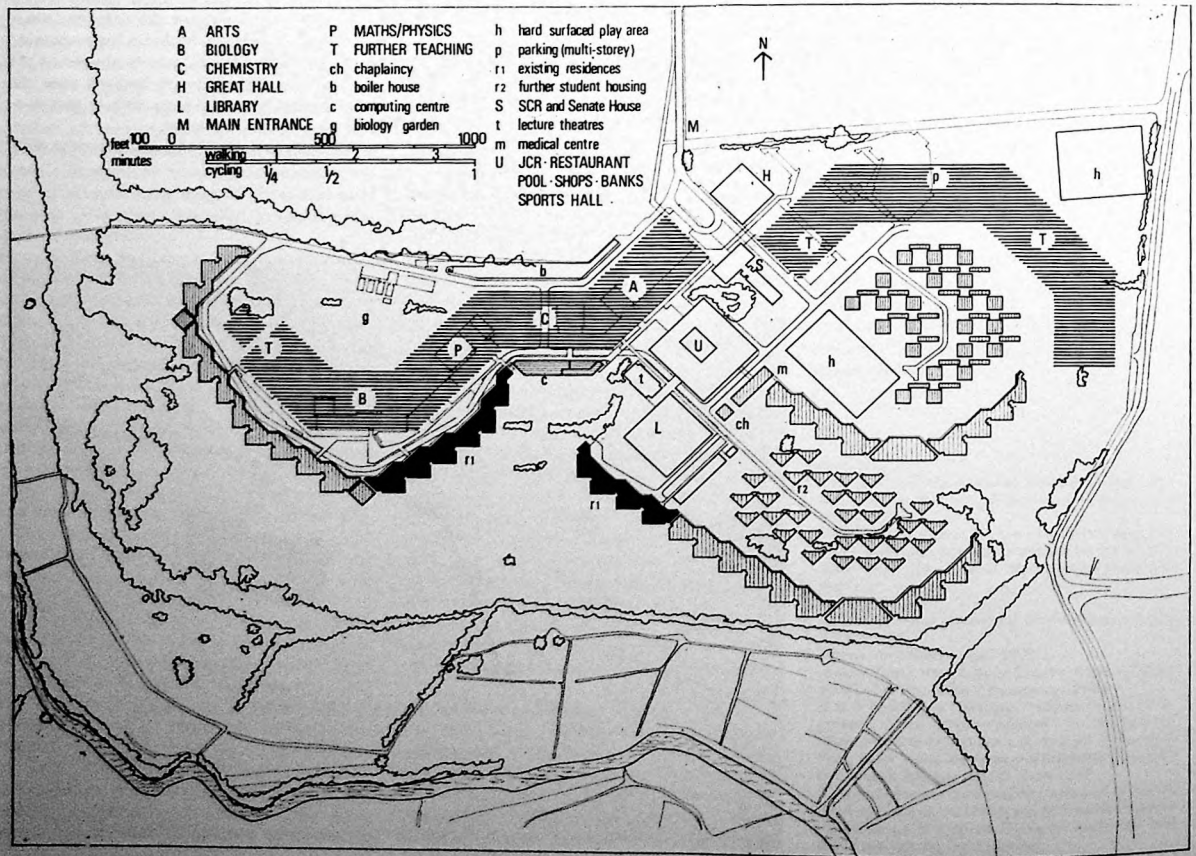
The University site, two miles from Norwich city centre, though by-passed by the principal national routes, is well situated for easy communication with the city and the region

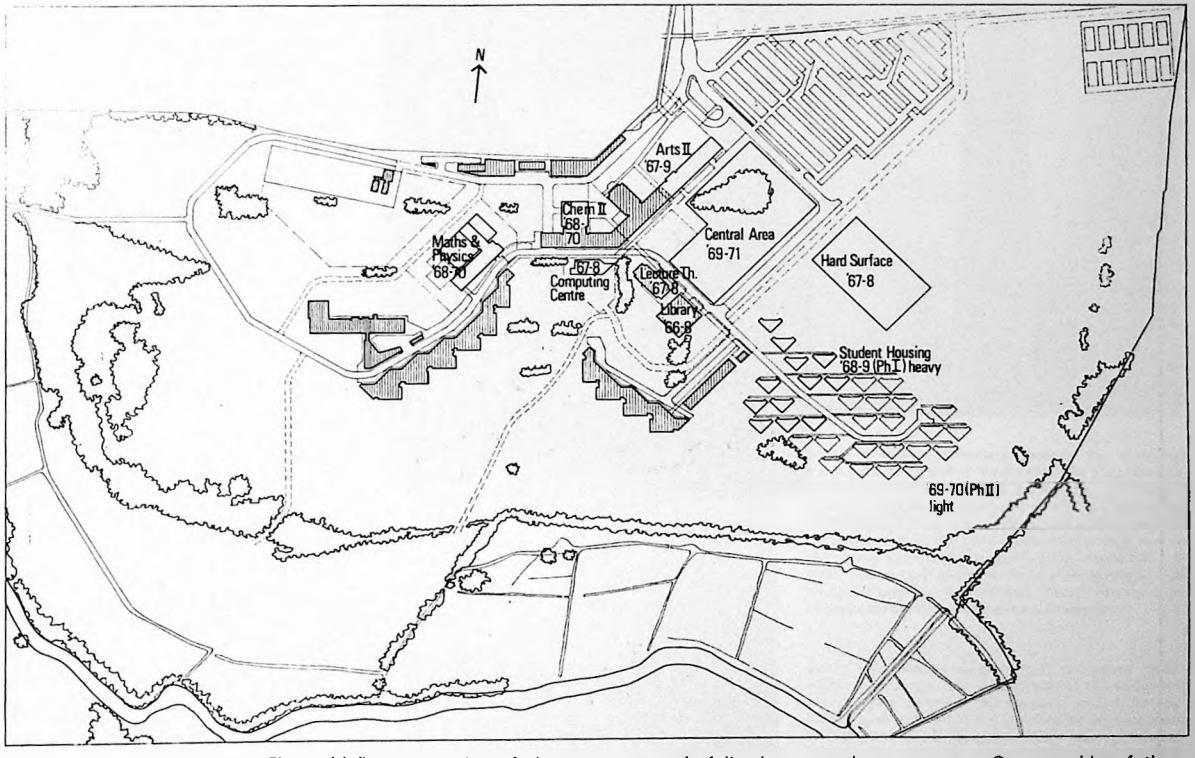


university of east anglia



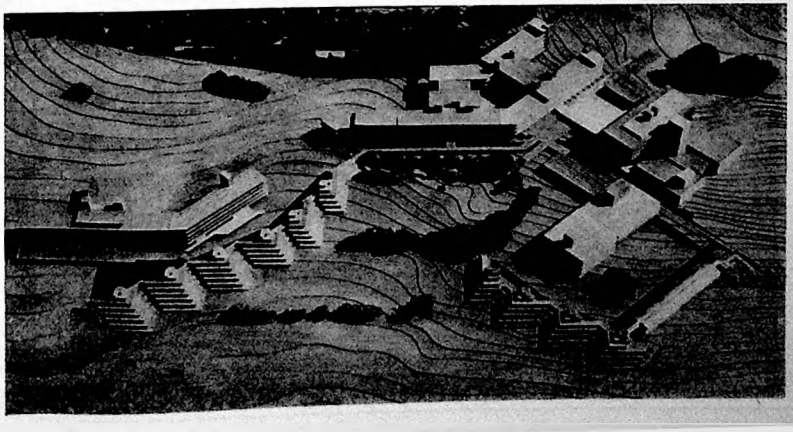






Facing page, top left: Development Plan model, first draft (1962). *Top right:* Development Plan model, second draft (1963). *Bottom:* Development Plan, third draft (1967)

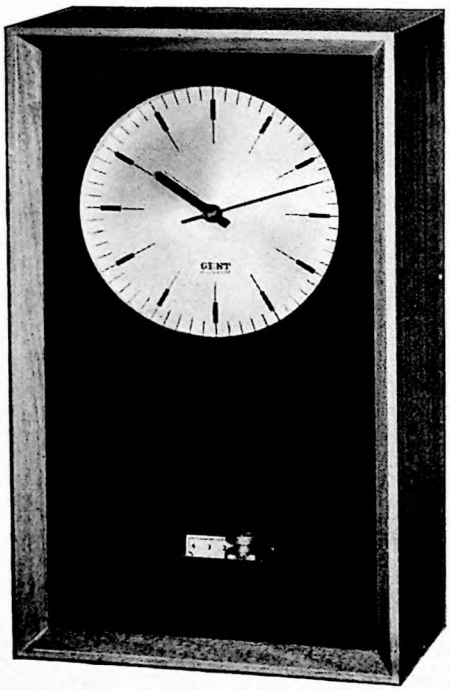
Above: General layout of site works, with completed buildings shown hatched. Compare Development Plan III, on facing page. *Below:* Model of the first stage



a number of changes were made following discussions with academic staff concerning their needs, but the basic principles established by the first draft have been maintained.

The buildings are disposed around a sequence of central spaces leading to a large re-entrant rough grass area. On one side of these spaces are the library, lecture theatres, and University House, containing dining rooms, common rooms, and other student facilities. Beyond these are the residences which in Draft I were approached by routes formed by teaching and research buildings but are now attached directly to the central corporate buildings. On the other side of the central spaces is a continuous belt of teaching and research accommodation, where in Draft I there was a mixture of disciplines on each side of the centre.

Draft III of the Development Plan embodies a number of changes arising out of changing circumstances and the needs of a growing university. There have been changes in the layout of some of the student housing (see plan, page 614). It was also decided to decentralise restaurant facilities to cater for students' preference for informality. In addition, alterations have been made to the main entrance. This area has been opened up so that the entrance becomes more conspicuous with the Great Hall, Senate House, and central complex leading from it into the central spaces.



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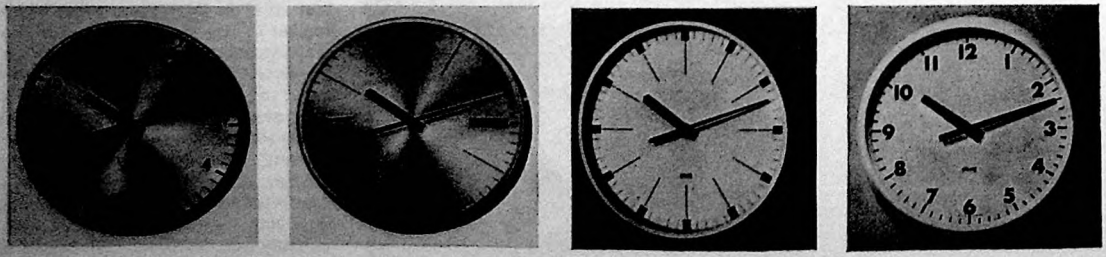

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A E J MORRIS

seven french bastides

[illegible] subject of the *bastides*—medieval [illegible] towns, in France, in England and [illegible] Germany—was the theme of the [illegible] ant series of articles on the [illegible] of [illegible] planning (*OAP*, September [illegible]). This photographic essay illustrating seven F[illegible] *bastides* forms a supplement to [illegible] history article which was con[illegible] France. In a future issue of *OAP* it is intended to illustrate Winchelsea—the English *bastide* which has retained much of its medieval character (in contrast to Salisbury and Kingston-upon-Hull which have changed greatly during subsequent centuries); and the Welsh *bastides*, which, with their increased military significance, giving the form of a civil town attached to an imposing castle, differ strikingly from the French *bastides* with their primary function of an agricultural settlement, the inhabitants of which were contracted as part-time militia for the service of the King.

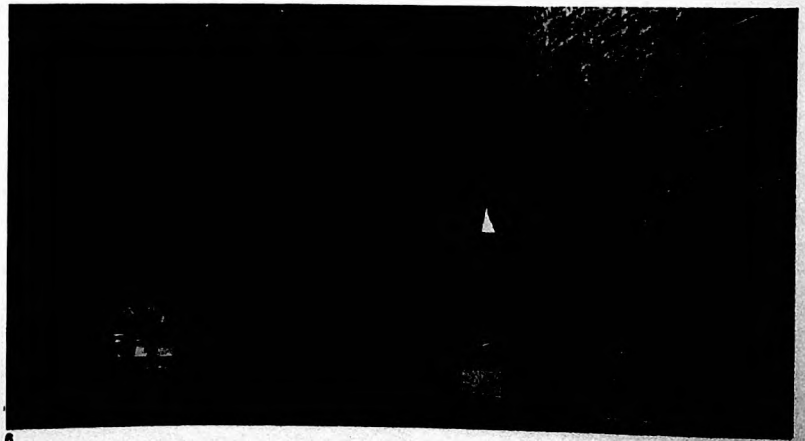
Above: **villefranche-du-perigord,** the surviving bays of the north side of the square, with the church to the right, immediately part of the square. The market hall with its open, imposing colonnades is a rebuilding of the Renaissance period. The centre of the town has moved east along the main street, leaving only two or three small general shops adjoining the market hall. A cafe, with a fully operative horse-shoeing blacksmith as its picturesque, if somewhat uneasy, neighbour is beneath the remains of the north side *cornieres*

Left: **villefranche-du-perigord,** a recently completed rebuilding of the western end of the square, in part use as a cinema. This square is unusual among *bastide* examples in that it is traversed by the main road through the town, diagonally from the north-west corner to the centre of the eastern side, alongside the church

Below: **monpazier,** from in front of the church looking through the north-east angle into the square, and under the eastern side *cornieres*, out of the town to the south

The seven *bastides* illustrated form a compact group south of the River Dordogne, about eighty miles east of Bordeaux. They are sited on the lower slopes of the spur which runs down westwards from the Massive Central, between the Dordogne and the Lot, to the south. Eymet, the most westerly of the group, differs from the others in that it is sited on low ground directly alongside a river without the benefit of the hilltop defensive location which is a general characteristic of French *bastides*.

In Europe, which is rapidly exploiting any tourist potential so much that sheer weight of visiting numbers has compromised, if not suffocated the original attraction, it is a rare delight to find these French *bastides* relatively untouched by tourism and in many essentials,



Below left : **monpazier,** across the square, past the market hall to the left. The *androne* gap between adjoining properties can be clearly seen between the two buildings on the right

Centre : **monpazier,** the north-east corner of the square looking towards the church. On the left of the view the continuity of the north side *cornieres* is broken for one bay between buildings number 15 and 16

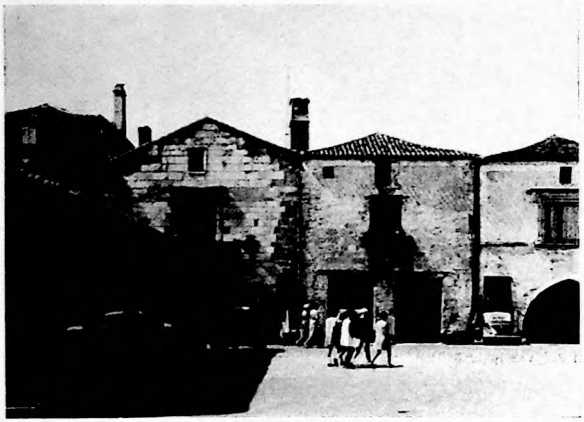
Bottom : **monpazier,** possibly the best individual photograph to give a general impression of the *bastides* in the mid-twentieth century.

plan of monpazier, photographic viewpoints 1–6. Key : a, church ; b, wellhead ; c, market hall ; d, surviving town gates ; e, *rue principale;* f, *rue secondaire*

Below right : **monpazier,** the north-west corner of the square with the original wellhead and the lively Sunday-morning-after-church open air cafe

Centre : **monpazier,** from outside the town wall, on the southern side, looking along one of the *rues-principales* to the *cornieres* of the western side of the square. The masonry of the gateway is in good repair including the gate and portcullis rebates.

Bottom : **eymet,** looking across the bridge into the town, with the *cornieres* forming the southern side of the square at the end of the street. Eymet has an unusual location, alongside the River Dropt



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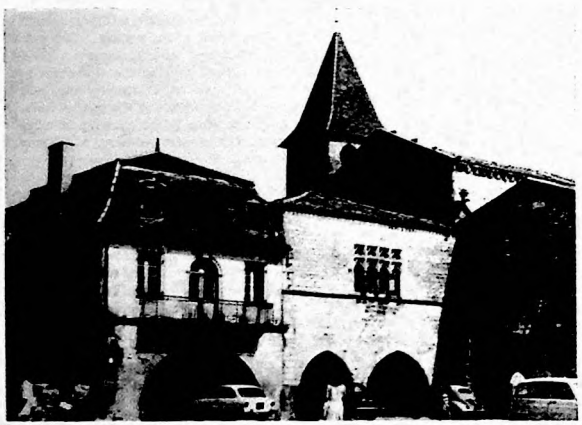

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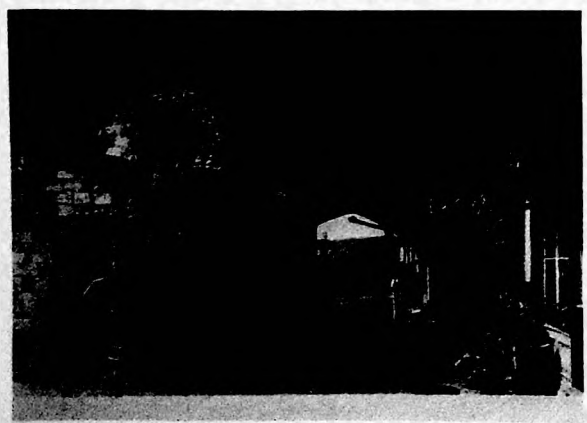
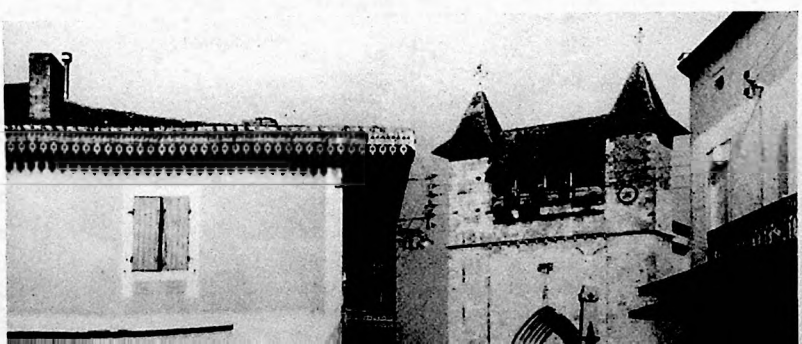


Above: **eymet,** the square, looking from the entrance into the square from the street leading from the bridge. The town has prospered and considerably increased in size although maintaining a number of high class shops. Even the local branch bank is open only for limited periods during the week

Right: **beaumont-du-perigord,** looking north-east across the square to the magnificent fortified church beyond the *cornieres* forming the side of the space. Beaumont has retained its *cornieres* on the north, west and south sides but the eastern side of the square has been rebuilt alongside the main road through the town, rather than over it as originally

Below: **monflanquin,** the town is sited on the south sloping side of a hill with the centre of the square cut back on the level into the slope across the space. This in itself is sufficient to give the square its own positive character and in addition there are a number of fine trees within the space. (This is in contrast to the general rule of *bastide* squares being essentially "built-spaces" with little or no natural forms)

Bottom: **villereal,** the church in its general *bastide* location, north-east of the central square



both visual and functional, oblivious of the "improvements" of the last century. The *bastides* are still off the beaten track with their particular qualities unrecognised in the popular guide books and visited only in passing by the package tours.

Such a general statement needs qualifying. *Bastides* were founded by the hundred in France. Few have made it, in the sense of becoming major towns with a regional significance—Carcassone, Libourne, Villeneuve-sur-Lot feature on small scale maps of France but they are the exceptions. Many have disappeared off the maps altogether, others survive with but vestigial remains of their past—Molieres, for which no photographs are available, is part of this group, but in form has fragmented into dispersed buildings with but one remaining of its original central square, arcade bays, facing a now grassed-over space.

Other *bastides* are prospering, in the sense that they can maintain specialist shops—dress shops, specialist chemists (as distinct from general shops with a sideline), butcher shops with a range of prepared *charcuterie,* bakers with *patisseries* in addition to the basic daily bread. Possibly but not necessarily, a branch bank which is open throughout the week rather than for a few hours on special days. In a number of instances this prosperity has led to the centre shifting away from the square to another, more recent part of the town. Four of this group of *bastides* can be seen as prospering: Eymet, Monflanquin, Villereal and Castillonnes, with their shops serving other than the limited market of the *bastide* itself.

Many other *bastides* are still in the process of a slow, centuries long decline, perhaps dating back to shortly after the reasons for the original foundation lost their validity. Monpazier, Beaumont-du-Perigord, and Villefranche-du-Perigord, which complete this group of seven *bastides,* have prospered less than the others.

A possible reason why the *bastides* remain little-known, in an increasingly planned world, is the unfortunate misconception that as a result of their planned origins the *bastides* are all alike. Professor Tout, one of the greatest of the academic school medievalists has much to answer for in this respect. In his authoritative *Mediaeval Town Planning,* he observes that ". . . you can bicycle or motor along the excellent roads of south-western France, and see them by the score; but when you have sampled half-a-dozen or so, you have no real need to pursue your travels any further, since all are very much alike".

This attitude has conditioned the general

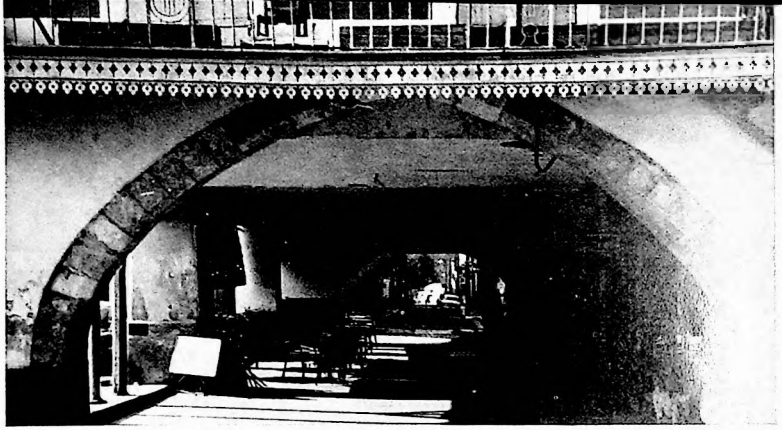
seven french bastides

guide book approach, and must have encouraged many visitors, both lay tourists and those concerned with the planning processes, into thinking that to see one or two, can be equated with having seen them all. The real attraction (and value in terms of contemporary standardised building, and possibly groupings) is in the existence of the *bastides* as variations on a theme. With the direct musical analogy, it is necessary to hear all the variations to understand fully their individual form and their inter-relationships. This is clearly neither practical nor necessary with the French *bastides* but only when each one is experienced in the context of a number of others can its essential individuality be understood.

As created, however, the *bastides* were based on very few planning components—a gridiron pattern of streets within a defensive wall and enclosing a central square, with the church frequently close by to the north-east corner. There was a clearly defined hierarchy of route spaces from the *rues-principales,* serving the fronts of properties and providing access into the square; through the much more narrow *rues-secondaires,* functioning much as the service access back-alleys in 19thC by-law housing; down to the narrowest space, the *androne,* which established a clear break between properties, avoiding party wall problems, inhibiting spread of fire, and functioning as a surface and soil refuse drain in many examples. The central squares themselves were normally surrounded by continuous arcading, the *cornieres,* and contained the market hall and the communal wellhead.

Even discounting the effects of seven hundred years of existence, with the continuing rebuilding process giving each *bastide* an increasingly individual surface appearance, the way in which the planning components have been fitted onto each site established individuality of form from the outset. Constructed with the limited range of local materials and in accordance with the design vernacular, the original buildings would again have been variations on a secondary theme. Time has increased the variations with the many happy relationships of medieval and Renaissance elements providing excellent examples of compatibility, but always within the discipline of similar materials.

The French *bastides* are clearly worthy of close study and the following photographs can only serve as an introduction. This selection of seven examples is taken from the large number of surviving *bastides* in this part of France. To illustrate many more would invite the danger of photographic representation creating an illusion of sameness which does not exist in reality.



Above : **villereal,** looking the length of the c[illegible]res on the northern side of the square and out [illegible] western edge of the town

Left : **castillonnes,** the *cornieres* of the eastern side of the square, looking towards the church which stands on the edge of a steeply sloping ground down to the River Dropt

Below : **villereal,** general view looking east within the square, which has retained its *cornieres* on the northern and part western sides. The two-storey market hall on the left is an ambitious structure, by comparison with the average somewhat rudimentary *bastide* provisions. The upper floor is in use as a public hall for a variety of functions

Bottom : **castillonnes,** a two-part town in which it is easy to miss the original *bastide* centre to the western end of the prosperous main shopping street. The market hall, in the centre of the photograph, is the exception to the general rule of compatible rebuilding over the centuries. Its particularly unfortunate version of "Victorian" gothic fails completely to fit in with the other natural products of vernacular building

SHEAN McCONNELL

Planning control in city centres

Chapters 12 and 13 in this series are concerned with the redevelopment of city centres. This article relates to the influence of planning controls on the bulk of buildings. The next one will range over some aspects of architectural design.

The form of urban centres, as of settlements generally, has evolved over the centuries as a result of social and economic pressures for growth. The geography of each site will affect the feasibility and direction of growth, but ultimately it is the value of land which influences the form of growth—upwards or outwards. Manhattan, New York, grew upwards because it could not grow outwards and because its commercial importance made its land values high enough to justify the construction of skyscrapers.

The design of some city centres has admittedly been influenced by intellectual and artistic efforts to design or to reconstruct them according to scientific or architectural principles; as in Vienna, Karlsruhe, Coventry and in all new towns and new capital cities. In other examples urban designers like those commissioned by the Popes of medieval Rome, John Nash in central London, and Haussmann in Paris, and Edmund Bacon in contemporary Philadelphia, deliberately set out to improve the design of a city centre so that it functioned and looked better.

Landlords of central area properties have traditionally redeveloped their sites when the financial returns reasonably to be expected on rebuilding justified the destruction of the old building and the cost of the new one. A site is theoretically ripe for redevelopment when the value of the cleared site is greater than that of the existing buildings. Normally it has been usual to construct new buildings with more lettable, or usable, floor space than that in the previous buildings on any site so that by more intensive redevelopment, and thus by increasing rental returns and capital value, the owner is reimbursed for the costs of redevelopment and ensured a profit commensurate with the risks and enterprise. Values, which are linked to turnover and, in turn, to accessibility, traditionally reach a peak in central areas. Thus over the centuries central properties have been increasingly over-built. The gardens of medieval houses were built over in the 18th century; and Georgian terraces replaced by office blocks in this century.

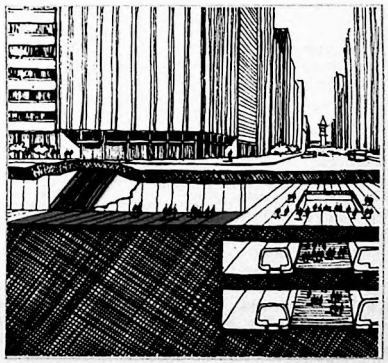
There are however drawbacks to this natural economic evolution. As the centres have become more intensively developed the modes and speed of access have been affected by the congestion in the centres; and, carried to its ultimate extreme, this means that eventually central area values start to fall, and the forces which give rise to decentralisation begin to take effect.[1]

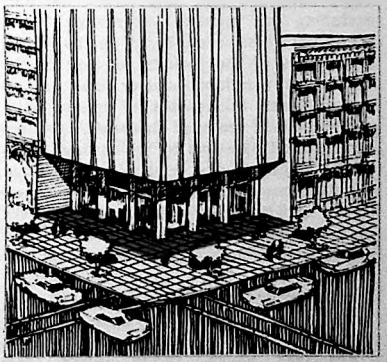
Another problem of over-development is that as the buildings become taller and bulkier so the environmental conditions within and around the buildings deteriorate. Less daylight and sunlight can penetrate; natural vegetation and open spaces are crowded out, and traffic nuisances dominate. As the buildings grow larger they accommodate and attract more people and vehicles: the result is congestion.

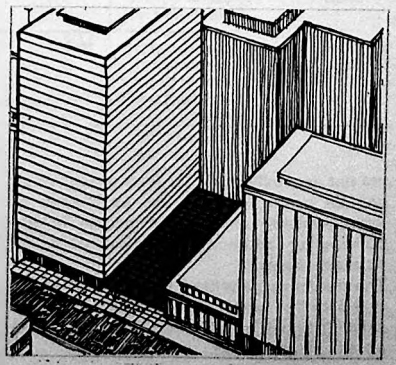
Another problem inherent in allowing economic criteria to be the sole yardstick of the form and rate of growth and renewal of urban centres is that this results in individual landowners redeveloping their own properties without regard for the buildings and area adjacent; and indeed without regard to the overall land use/transportation strategy for the total urban system. Thus, to prevent "unneighbourly" schemes, and to ensure that all new developments conform to the Development Plan proposals, planners have to concern themselves with the detailed control of all new buildings. These controls are varied and overlapping.

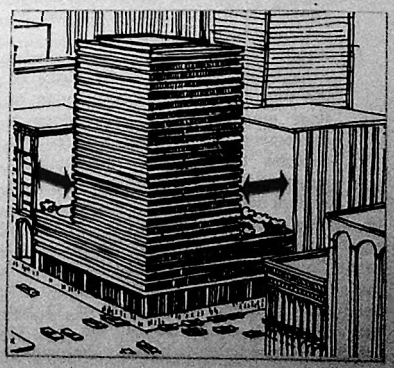
summary of controls

1 *Land Use:* Land values reach a peak in urban centres, and the price mechanism is supposed eventually to result in the "highest and best use" being obtained; but as No 9 in this series indicated (*OAP*, September 1967), only certain land uses are suitable for city centres.
2 *Floor Space: Plot Ratios* (and floor space index); by which the bulk of buildings are regulated.
3 *Height* of buildings.
4 *Daylighting and Sunlighting* regulations.
5 *Architectural* or aesthetic control on the appearance of buildings.









Selection of bonus features (see table, page 526). *Top left:* Rapid transit access directly from the site to the mezzanine level. *Top right:* Pavement widening inside the property line. *Bottom left:* Plaza extending from pavement, accessible to the public. *Bottom right:* Low coverage at upper floors (about 80 ft) permitting light and air penetration

6 *Car Parking,* loading and unloading and other regulations on the use of the building by vehicles. (Car Parking was the subject of No 11 in the series, *OAP,* March 1968).

Numbers 2 to 4 will be discussed in this article. No 5 will be mentioned in the next in this series.

floor area : plot ratio

Organised planning departments have (or should have) a printed statement which defines and explains their authority's planning standards. This is (or should be) made available to the public. The following is an extract from *Leeds Central Area Master Plan.*

"Plot Ratio expresses the relationship between the area of a site and the total gross floor area of the building which has been, or is intended to be, erected on it. In any particular instance, it provides a figure which can be compared with the standard plot ratio approved by the Council for that area and is therefore a guide to the suitability or otherwise of the bulk of the proposed building. It may be applied to nearly all except residential buildings. The area of a site employed in determining the plot ratio is the net area excluding any parts of adjoining streets. Gross floor area is measured on the overall dimensions of the building or part of the building at each floor above or below ground and includes thicknesses of internal and external walls, areas of staircases, corridors and covered passages by which there is no public right of way, lavatories and other private accommodation enclosed or covered by the building. It includes any basement or part basement used for office, living or similar accommodation, but deductions *may* be made for :

(*a*) Underground private garages and vehicular standing for loading and unloading purposes.

(*b*) Bank vaults, strong rooms, safe deposits and such storage as may be approved by the Council.

(*c*) Electricity sub-stations and similar exceptional uses which, by virtue of the type of permanent occupation of floor area are likely to produce a movement of persons, goods and vehicles to and from the building substantially less than that arising from normal occupation.

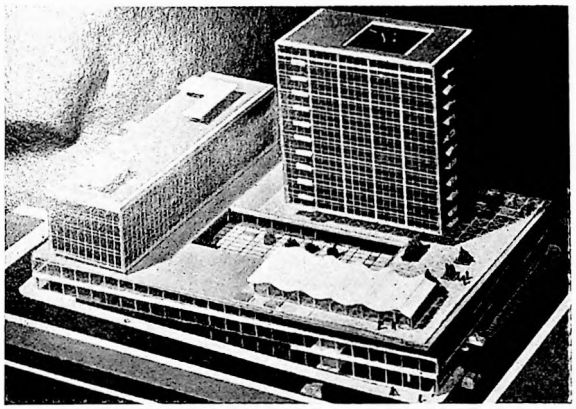
In making deductions under (*a*), (*b*) or (*c*) above (which are entirely at the discretion of the Council), regard is paid to the nature of the accommodation in respect of which the deduction is made, particularly as to the permanence or otherwise of the use to which it is immediately to be put. Deductions are not generally made for floor space which can be converted from use as storage to uses involving either more people in the building or additional vehicular traffic in adjacent streets."[2]

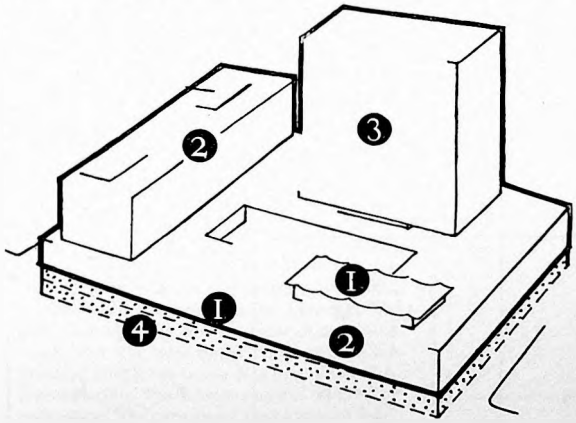
The maximum permitted plot ratio in Leeds is 3·5 to 1; which is in fact less than the existing figure on all but a few very small sites in central Leeds.

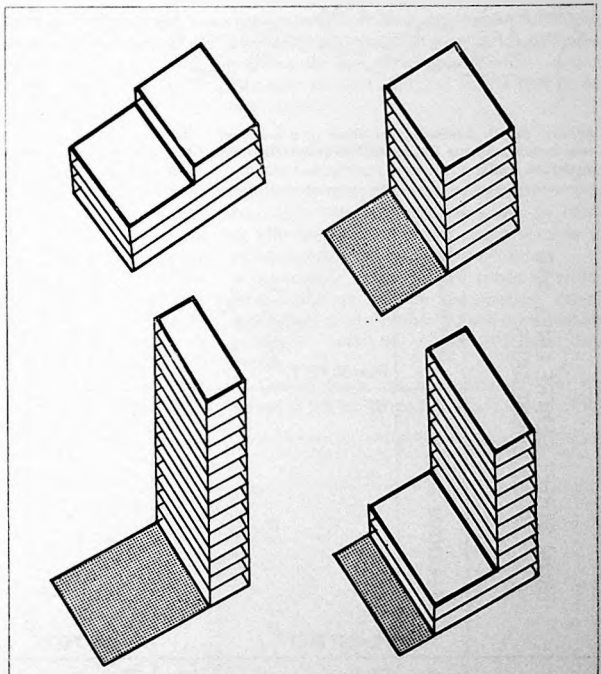
quantity of bonus floor area for each building feature provided

Building feature	*Unit of feature upon which bonus is based*	*Square feet of bonus floor area per unit of feature*				*Basic allowable gross floor area*
		Downtown office district	*Downtown retail district*	*Downtown general commercial district*	*Downtown support district*	
1 Rapid transit access (Larger of these two bonuses applies)	Provision of direct access to station mezzanine	20 per cent. of basic allowable gross floor area (one-third less if station is for city transit only)				20
2 Rapid transit proximity (Larger of these two bonuses applies)	Each linear foot by which walking distance to station mezzanine is less than 750 feet	50 (one-third less if station is for city transit only)	40	40	40	10
3 Parking access	Each automobile parking space to which direct access is provided	100	100	100	100	5
4 Multiple building entrances	Each principal entrance to the building after the first entrance	10,000	10,000	7,000	5,000	5 (or one entrance, whichever is greater)
5 Sidewalk widening	Each creditable square foot of sidewalk widening area	7	7	6	4	15
6 Shortening walking distance	Each linear foot by which walking distance between streets is shortened	40	40	40	30	10
7 Plaza	Each creditable square foot of plaza area	10	8	8	6	15
8 Side setback (Larger of these two bonuses applies)	Each creditable square foot of side setback area	6	6	6	3	15
9 Low coverage at upper floors (Larger of these two bonuses applies)	Reduction of both building dimensions by 20% or more of the lot dimensions	5 per cent. of basic allowable gross floor area for the first 20 per cent. reduction of building dimensions; 1 per cent. for each 3 per cent. reduction thereafter				15
10 Observation deck	Provision of observation deck or similar high level public space	10,000	10,000	10,000	10,000	Not applicable

This situation is common to many British cities, and reflects the over-development of many centres in the past, with inadequate provision for vehicular servicing and parking, and loss of amenity by reason of overcrowding of buildings. The table, which is shown, is based on a questionnaire sent out two years ago, and the information has had to be condensed, so that it may not be com-







Top and bottom left: Example of mixed development comprising hotel with offices, shops and showrooms in the 3½ : 1 ratio zone. Non-residential plot ratio = 3½ : 1. Residential plot ratio = 1½ : 1. Key: 1, shops and restaurant (94,850 sq ft area, plot ratio 3·44); 2, offices and showrooms (70,750 sq ft area, plot ratio 3·44); 3, residential hotel (75,450 sq ft, plot ratio 1·56); 4, car park and services (48,450 sq ft). *Above:* Some of the ways in which a building may be erected on the same site at a 3½ : 1 plot ratio

pletely exact for any particular city. Most planning authorities try to preserve some flexibility so that every application can be considered with reference to the characteristics of the site; and, in an attempt to reintroduce living accommodation into city centres, extra floors are often allowed above shops and offices to be used for residential purposes.

Examples of plot ratio and floor space index controls in some British city centres

plot ratio	*permitted*	*existing*
Leeds	3·5:1	3·5:1 (generally more)
Belfast	4·5:1	8:1 max.
Nottingham	rarely exceeding 3·3:1	6:1
Edinburgh	Princes Street 4·5:1. Rest 3·5 & 2:1	Princes Street about 7:1
Birmingham	4·5:1	—
Manchester	3·5:1	8:1 (general max.)
Central London :	Generally 3·5:1 (with ½:1 extra residential use); rising to 5:1 in certain areas and to a maximum of 5½:1 around the Bank of England.	very varied
Liverpool	3:1 (except under special circumstances, with extra floors allowed for residential use)	—
floor space index	*permitted*	*existing*
Swansea	2·0:1	Av: 1·4:1
Oxford	Max approx 2·0:1	Av: 1·96:1
Bristol	About 3:1	—
Plymouth	2:1	—
City of London (1939)	—	Av: 3:1 (3·9 around Bank of England)

Thus the figures for some British cities in the table (by and large the ones whose planners answered the questionnaire or for which published information was readily available[3]) are approximations only, being neither absolute maxima nor guaranteeing that the figures quoted will be allowed in every case. In addition it must be remembered that the "3rd schedule rights" implicit in the Town and Country Planning legislation allow a one-tenth increase in floor space on redevelopment.

The purpose of Plot Ratio control has been given in Planning Bulletin No 1.

"In general, over the town centre as a whole, the aim should be to fix building densities in a way which provides opportunities for achieving a desirable height and massing of buildings, and strikes a balance between the street and car parking capacities and the traffic attracted by the buildings.

Above: Sketch illustrating the effect of a proposed new building on the Oxford skyline (*High Buildings in Oxford*, 1962)

Below: Diagram shows dimensions for drawing the four sets of daylight indicators (*Planning for Daylight and Sunlight*, MoHLG, 1964)

FROM STREET CENTRE LINES AND PLOT BOUNDARIES	NON RESIDENTIAL ZONES	A1 PL=60 FEET	A2 PL=71 FEET	A3 PL=87 FEET	A4 PL=107 FEET
	RESIDENTIAL ZONES	B1 PL=107 FEET	B2 PL=137 FEET	B3 PL=187 FEET	B4 PL=284 FEET
FROM OTHER BUILDINGS ON THE PLOT	NON RESIDENTIAL BLDGS.	C1 PL=120 FEET	C2 PL=142 FEET	C3 PL=174 FEET	C4 PL=214 FEET
	RESIDENTIAL BUILDINGS	D1 PL=214 FEET	D2 PL=274 FEET	D3 PL=374 FEET	D4 PL=568 FEET

[illegible] for any particular use or part of the [illegible] to be fixed at a level which will [illegible] development where required but [illegible] scope for building design in [illegible] with the surroundings, without attracting more traffic than the area is able to accommodate."[4]

An interesting justification of this form of control is given in a recent report by the planners of San Francisco : "Overloading of individual sites can create unwarranted monopolies in building space, to the detriment of development potentials in the remainder of the district. The result would be a paradox of high bulk and high value accompanied by sterilisation of undeveloped sites.

In areas of excessive development, light and air to streets would be seriously impaired, the bulk of buildings would become psychologically oppressive, and damage would be done to the character and economic health of the community. At the same time, street and transit systems would become unnecessarily overloaded at certain locations".[5]

floor space index

In the table shown some of the figures are quoted as a Floor Space Index (FSI) rather than as a Plot Ratio. The FSI is a method of measurement of intensity of development advocated by G T Pound in 1947 and by the then Ministry of Town and Country Planning.[6] It expresses the relationship between the area of a site *plus half the area of adjoining roads* and the total gross floor area of the building which has been, or is intended to be, erected on it. FSI is thus a useful method of comparing the density of development between sectors of a city, or between one city and another. For controlling or comparing development of individual sites it is misleading, since sites fronting onto a narrow street would theoretically be able to be developed more intensively than sites alongside a broad thoroughfare, or corner sites with road frontage on two sides.

Because of its inexactness the use of FSI is declining as rapidly as new planning reports are prepared.

floor area bonus

Cross-fertilisation of planning ideas between European countries and across the Atlantic is often slow. In North America "plot ratio" controls are called "floor area ratio" controls; but neither term is as explicit as "Plot : floor area ratio" would be.

In most North American city centres the permissible floor-area : plot ratio is much higher than in the U.K. In Toronto there is a range of 4:1 to 9:1 depending on locality. In the major American cities the range is 10:1 to 16:1[7]; and in addition there is usually a bonus for buildings incorporating certain features which improve the environment.

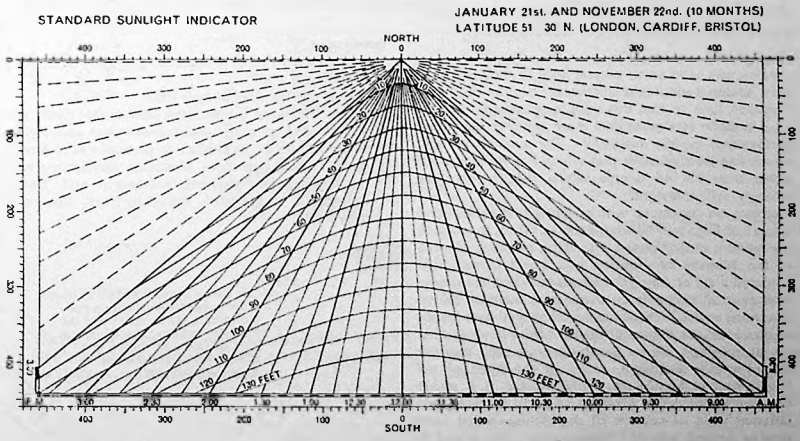
In San Francisco the floor area ratio for the 16 blocks in the heart of the office district is 7·5:1; but the average for buildings likely to remain is 10·3:1, and for the 18 newest office blocks 12·6:1. The new base recommended is 14:1, with bonuses. The bonus features recommended in San Francisco, after research, are as in the table shown. Items 1 to 3 are concerned with accessibility and reducing pedestrian overcrowding on the sidewalks; 4 to 6 are also to reduce sidewalk congestion; 7 is for amenity; 8 and 9 provide more light and air to the street. With bonus allowances a floor area ratio could theoretically be 25:1 in certain unusually favoured sites. The figure of 14:1 was recommended for the office district only; with a decrease to 10:1 and 7:1 in the rest of the city centre.

height of buildings

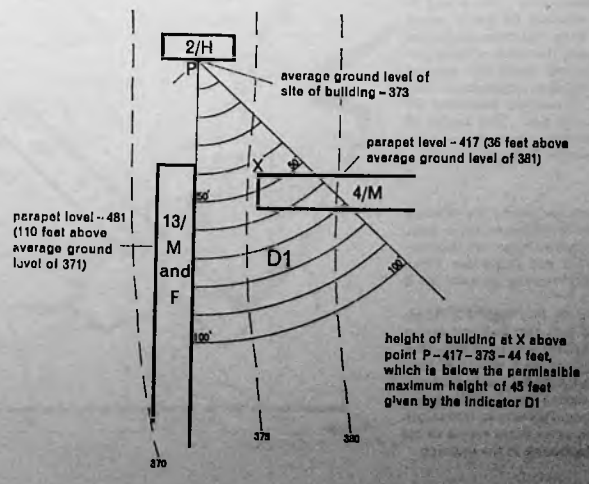
Height restrictions will be applied in certain central districts of special character in San Francisco. In particular there will be limits of 160 feet around down-town squares to safeguard the penetration of sunlight.

In Liverpool ". . . there are zones in which high buildings will be encouraged, others where they will be prohibited and others where proposals will be considered on their merits . . ."[8]

In Oxford there has been anxiety over the threat of tall buildings to historic views of the



Above: Standard sunlight indicator from *Planning for Daylight and Sunlight*



Left: Diagram showing use of a daylight indicator from *Planning for Daylight and Sunlight*

city of "dreaming spires". And in the Shankland, Cox proposals for Ipswich tall buildings will, with existing and newly planted trees, emphasise the "ruin of the bowl" in which the centre is sited.[9]

Generally, as in the proposals for Liverpool, tall buildings can be encouraged at focal points in the centre to provide visual emphasis and even drama and architectural contrast. But around areas of historical or architectural importance new tall buildings may detract from the area's existing character.

daylighting and sunlighting

This is a type of planning control which has been definitively explained in the MoHLG Planning Bulletin, No 5, *Planning for Daylight and Sunlight,* 1964. A few examples are illustrated from this booklet to show the sort of detailed control which is needed with every new application for development.

daylighting

Landowners who enjoy natural light to their windows may under certain circumstances acquire rights at Common Law so that this light is protected; but the legal position is a great deal more complex than most professional people realise.[10] The amount of light which can be claimed is that which has been enjoyed rather than the 45 degree which people associate, wrongly, with this right.

Planners are concerned with ensuring that present and future buildings may be adequately lit. Thus, to measure the amount of daylighting a building receives, officials of the Ministry of Housing and Local Government prepared a set of *Daylight Indicators,* which are simple mathematical diagrams on transparent material, drawn to various scales. These are superimposed over layout plans to test the degree of daylight from unobstructed sky to buildings. Since the sky may be seen over the top of nearby buildings, or round the sides of tall blocks, each of the four sets of indicators, A, B, C, and D has four indicators to each set so as to measure four different sorts of sources of daylighting—either from over or around adjacent obstructions. The A and B indicators are "boundary" indicators for use at street centre lines or boundary lines between properties (assuming these to be mid-way between present and future buildings); and are used when the type of future development on adjacent sites is unknown. The C and D sets are building-to-building indicators for measurements within the same site. The angles of light between residential buildings are measured with indicators B and D; while A and C are used for non-residential buildings.

sunlighting

Sunlight Indicators have been devised by the Ministry to show, when placed against windows on a plan, how many hours of sunlight that window can theoretically receive on January 21st and November 22nd, on a particular latitude. In Planning Bulletin No 5 the MHLG state :

"The British Standard Code of Practice CP3, 1945, recommends for houses and flats that in living rooms and, where practicable, in kitchens and bedrooms also, one of the windows forming the main source of daylight should be so placed that sunlight can enter for at least one hour at some time of the day, during not less than 10 months of the year from February to November. It is preferable for sunlight to enter living rooms in the afternoon and kitchens and bedrooms in the morning. In arriving at this standard :

(*a*) sunlight is not considered as entering a room if the horizontal angle between the sun's rays and the plane of the window is less than 22½ degrees, and

(*b*) sunlight is not considered to be useful unless the sun has an altitude above the horizon of more than 5 degrees.

In considering the siting of a dwelling so that this standard can be achieved, it is first necessary to make sure that the configuration of the surrounding land will allow sufficient sunlight to reach the site. . . . Even where there is a clear view due south from a site on which building is contemplated, it is necessary, in order that the sun can be visible at the highest point of its daily path for ten months in the year, to make sure that no continuous obstruction rises above an angle of 18½ degrees (a slope of about 1 in 3) for the latitude of London and Cardiff and of 15 degrees (a slope of about 1 in 4) for the latitude of Newcastle upon Tyne".[11] Neither daylighting nor sunlighting controls should be used rigidly in development control; and are more devices to ensure good design by architects than negative weapons to be used against developers. In practice the bulk of a proposed new building is more likely to infringe plot ratio than daylighting standards.

footnotes

1 Discussed in "The Future of city centres", *OAP,* September 1967.

2 Leeds Central Area Master Plan.

3 In the following British cities neither Plot Ratio, nor FSI is used as such; but instead each application is considered on its merits; in particular as to how it would affect the scale, character, daylighting and sunlighting of adjacent buildings, and traffic generation : Bradford, Norwich, York, Coventry, Sheffield.

4 *Town Centres : approac[illegible]al,* MoHLG, HMSO, 1962, p 15.

5 *San Francisco Downtown [illegible]dy,* Dept. of City Planning, Final Report [illegible] 1968. This report continues : "To illustrate [illegible] potency of office construction in producing pedestrian and vehicle traffic, one floor of office space covering a 113,000 square foot block north of Market Street (equivalent to one point of floor area ratio for the block) has the effect, under present conditions, of attracting each day approximately 550 employees, 230 building visitors, 85 automobiles of employees driven downtown, 90 other automobile trips to the downtown area, 15 truck trips to the block and 545 riders on public transit. To put these figures into further perspective, each may be multiplied by 45 to determine the effect of a single floor of offices covering the entire 5,153,000 square feet of land contained in the office district." (p. 19).

6 Watts, K, *Functional Control and Town Design,* Building Research Station, DSIR, Design Series 14 : reprinted from *The Arch. Jrnl.,* 23 Oct., 1963.

7 As 5 above. The floor-area : plot ratio for the Empire State Building is 25 :1 but for the Rockefeller Centre, N.Y., only 12 :1.

8 *Liverpool City Centre Plan,* 1965.

9 Shankland, Cox & Associates, *The Expansion of Ipswich,* MoHLG, HMSO, 1966.

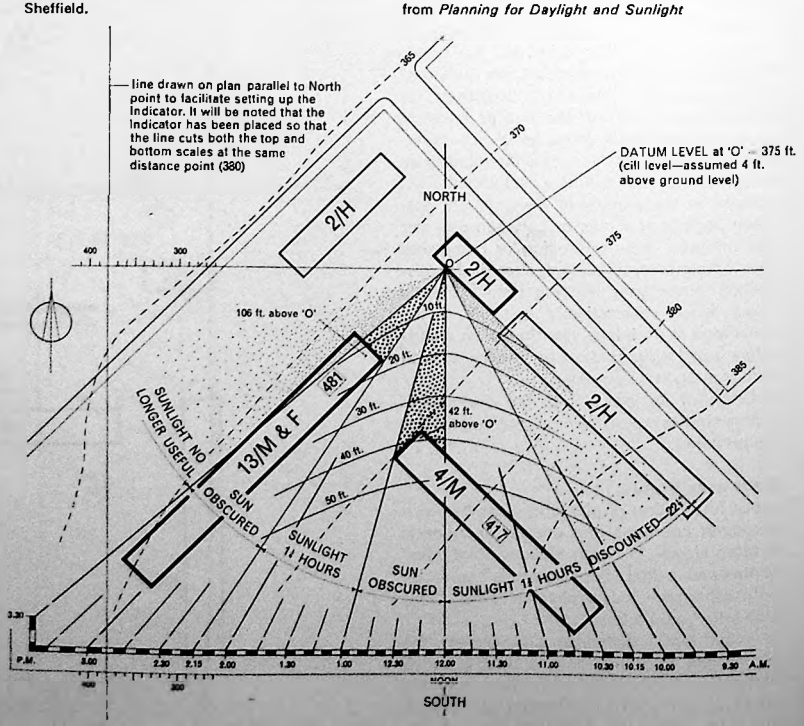
10 Anstey, Brian & Chavasse, Michael *The Right to Light.* Estates Gazette, c. 1963.

11 MoHLG, *Planning for Daylight & Sunlight,* HMSO, 1964, 5s.

reference

Hopkinson, R G, Petherbridge, P, and Longmore, J: *Daylighting.* Heinemann, 1966.

Below : Diagram showing use of sunlight indicator from *Planning for Daylight and Sunlight*

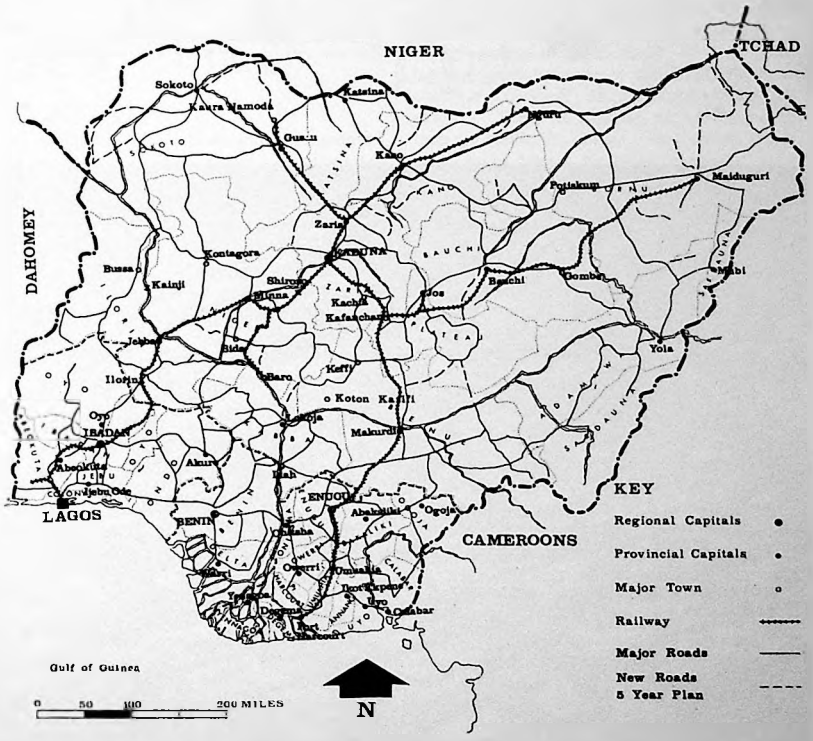


plan for kaduna

Shean McConnell reviews "A Survey and Plan of the Capital Territory of Kaduna for the Government of Northern Nigeria", by Max Lock and Partners, describing it as "a study with a value which exceeds its local importance". It was published by Faber & Faber at the end of last year.

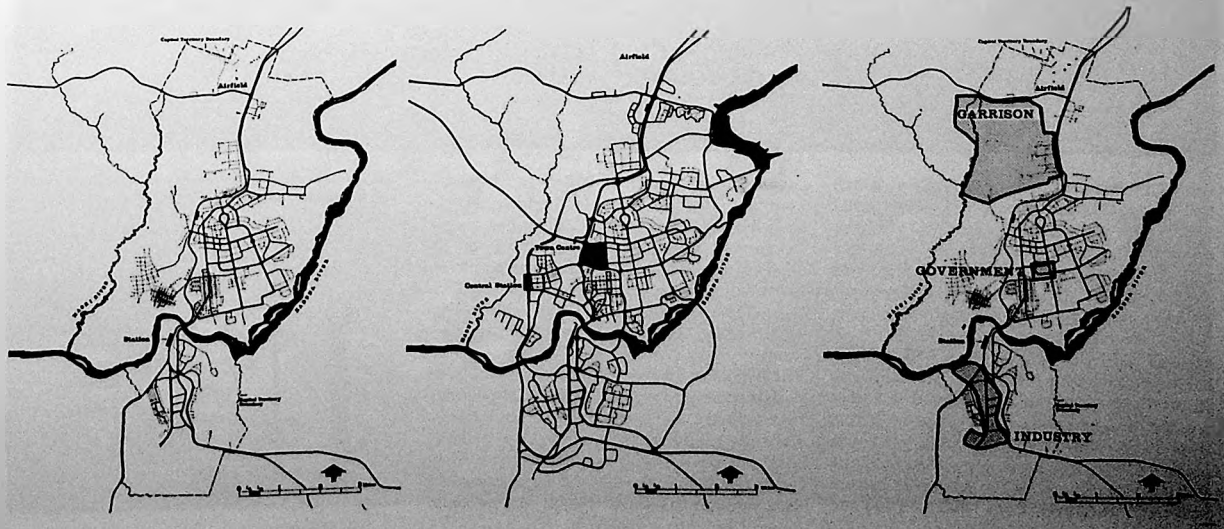
The value of this comprehensive and large hard-covered book is that it is a model as to how a survey and plan for an urban area in a developing country should be prepared. This is not merely a superficial collection of photographs and sketches, of proposals for an architecturally impressive urban creation in remote Africa; there are few frills, and the book is dominated by facts, figures and carefully prepared maps, sketches, statistical tables and legal and administrative recommendations. Many of the maps are in three colours, and these have contributed to its rarity-value price of £8 8s. The first edition is limited to 2,000 copies. It is sad that this price will limit its circulation, since it should be readily available to all planning students and consultants. There is little doubt that, like Max Lock's famous Survey and Plan for Middlesbrough in 1946, this is a study with a value which exceeds its local importance.

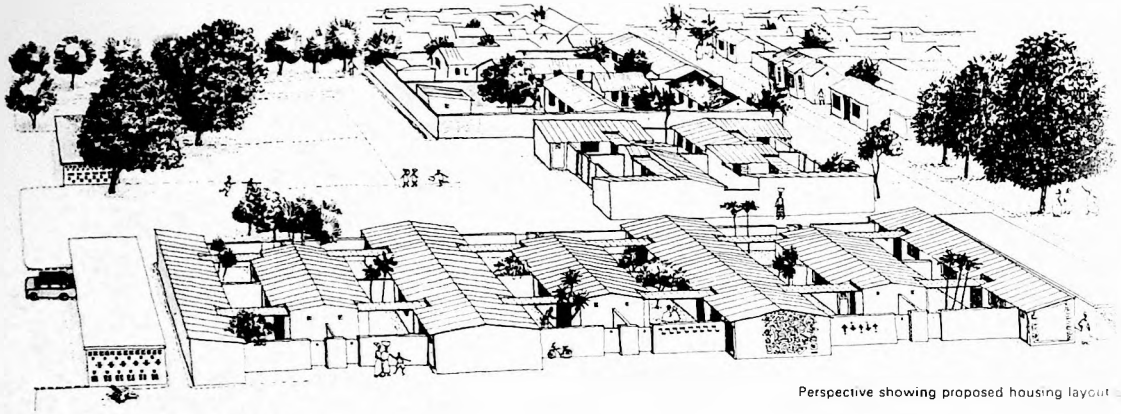
This city is hot and dry in the winter and yet has 40-60 inches of rain in summer. It was the



Above: National Railway communication network. The site for Kaduna was chosen over 50 years ago for its strategic position on the railways

Below: Traffic in Kaduna—*left*, existing roads and rail; *centre*, proposed road and rail network; *right*, three centres—government, industry, and garrison





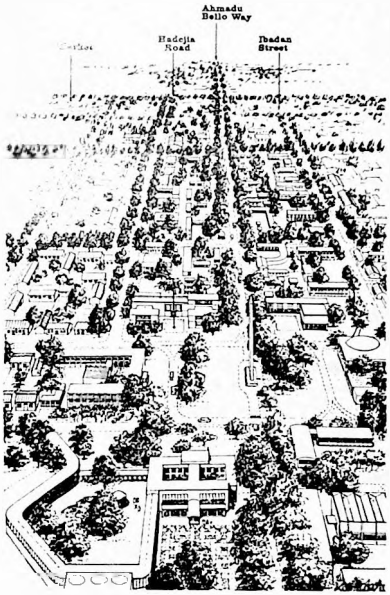
Perspective showing proposed housing layout

capital of Nigeria's Northern Region, which had a regional population of 33 million, until 1967; but after the troubles of 1966, the country's regional structure was changed and Kaduna was demoted. Before this happened the UK Ministry of Overseas Development had commissioned Max Lock & Partners to prepare this plan.

Kaduna was originally laid out as a military headquarters settlement for Lugard, the Governor General, who approved the first grandly conceived colonial plan in 1917. Until 1957, when the large cotton mill was built, Kaduna was mainly an administrative and military centre, with service industrial activities. However, from 1952 to 1963 the population grew from 39,000 to 149,000—the common phenomenon of rapid migration to urban centres which is found in all developing countries. Only 6,000 of the working population of 42,500 are employed in manufacturing industry; with 7,600 in large scale and 18,600 in small scale service employment, and 10,300 in public employment.

The problems of this city are typical : overcrowding in poorer residential areas; underdevelopment in the posh areas around Lugard's residence, where the civil servants lived; a road layout which is unsuited to traffic volumes of the future; a railway which cuts through the urban fabric. In particular

Above : Casual grid-iron pattern of one of the poorer areas. *Below :* Entanglement of overhead wires on a roadway



The redeveloped Ahmadu Bello Way looking north from the civic centre

the long, 2-mile spine of the city, Ahmadu Bello Way, as illustrated, is a dismal collection of scattered buildings, lopped trees and overhead wires strung over the public way. The poorer districts have to rely on a manually operated sewage system, ie, buckets of sewage left in ditches until night and then tipped into open lorries for dumping—a salubrious occupation which even the most destitute of the local unemployed are reluctant to undertake.

a realistic plan

Two aspects of the plan show its authors' refusal to be unrealistic. First, the proposal to move the railway at a cost of £1·9 million, from the centre to the edge of the built-up area, is supported by a convincing cost-benefit analysis showing the overall financial advantages in moving the railway. (Yet one wonders whether it will ever be moved.)

Second, the authors have resisted a *beaux arts* approach to urban design in the central area or areas. It would have been tempting to try to regroup at least the city centre functions into one compact area instead of allowing them to be separated by distances too great for pedestrian convenience.

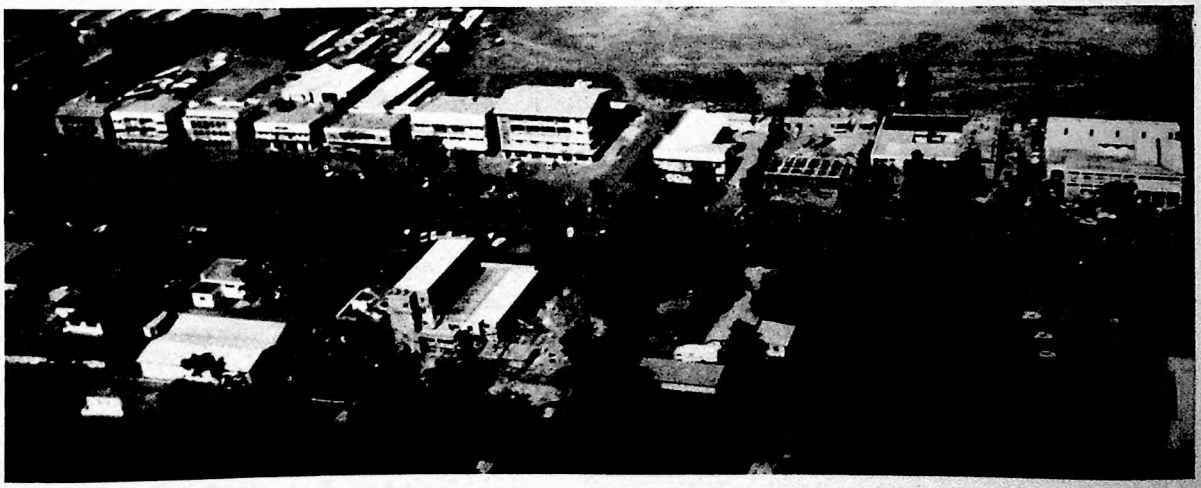
Using traffic planning criteria it can be said that in the future motorists can visit all these centres, and circulate freely, allowing for high levels of accessibility in the days when the citizens mostly drive about their business—however these affluent days are well into the future for Kaduna's people. But using social, functional and visual criteria, this will be a city of several centres one or two miles apart. This means a dilution of investment in each and, surely overall, a loss of civic amenity, cohesion and status. The proposals are, however, realistic, being moulded around the existing nuclei, presumably on the argument that to regroup these existing centres would necessitate more buildings to replace those already in use, and that there is already a sufficient need for expenditure without an idealistic impractical-theoretical approach to urban design. One result of this plan is the perpetuation of the colonial, neo-classical, concept of a triumphal central avenue. Parts of this are to be closed to through traffic, in theory : but would it not have been better to have proposed new buildings closer to and indeed over Ahmadu Bello Way, forming a series of urban spaces ? Other realistic aspects of this report are the proposals for inexpensive housing and for the sub-division of plots for redevelopment.

A strength of the plan is its insistence that Kaduna be considered in its regional context. There are recommendations for more agricultural and forestry production in the sub-region. At present 90 per cent. of the city's food supplies are imported.

"Town Planning has been called the oldest of the arts and the newest of the sciences", wrote the authors. The Kaduna plan is stronger on the scientific than on the artistic level; but this is reasonable in this instance. The questions left in the reader's mind will be whether Kaduna, in this century, will really be able to afford the administrative and professional staff to be trusted to implement the proposals, and whether the legislative and governmental boundary reforms needed will come about. There was a time not long ago when the UK might have offered more help with the on-the-spot implementation of this plan. Maybe the United Nations could help; but there are a lot of cities like Kaduna in the queue.

Shean McConnell

View of Ahmadu Bello Way



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norwich draft plan

The Norwich Draft Urban Plan, which is reviewed below, has been prepared for the guidance of developers until a detailed study is carried out. One of the objects of the plan is to indicate how Norwich will be developed as a regional centre over the next 30 years, while preserving the character of the city and its amenity by containing the impact of motor traffic.
"Planning Review" is prepared each month by a team of planners including Michael Croft and Richard Mordey, under the supervision of Anthony Goss.

City of Norwich Draft Urban Plan 1967. A A Wood, City Planning Officer. Price 2 gns.

This plan is essentially an interim measure. Consideration is being given to the Norwich City Region by both the City and the County Planning Departments. Simultaneously, a land use/transportation study is taking place to provide a detailed basis for the transportation proposals included in the draft plan. Among the reasons for publishing the plan at this stage are to give some guidance to potential developers and to safeguard the routes of new roads.

objectives

This interim state of affairs seems to have been created by the publication of the PAG Report and the impending planning legislation. Without knowing the background which led to the decision to produce this plan it is impossible to say whether it would have been preferable to prepare a complete statutory document as Coventry have done. One can appreciate a Council's desire to keep the machine moving rather than exist in some sort of limbo but there is a danger that the outcome of the detailed studies may well duplicate or even negate some of the work already carried out.

Based on a "planning appraisal" the draft urban plan aims at complete integration of land use and transport planning. The objectives of the plan are described as :

1 To develop Norwich further as a regional centre, for commerce, shopping, industry, education, culture and the holiday industry.
2 To preserve the character of the historic city.
3 To evolve a location policy for anticipated spontaneous population increase in the city area. (The population of the built-up area centred on Norwich in 1965 was 207,500, and it is estimated that this could reach 338,700 by the year 2000.)
4 To provide for a possible overspill from London which the South-East Study estimated at 30,000 but which may be exceeded.

Alternative forms and locations for growth have been examined jointly with the Norfolk County Planning Department. A short list of four alternative solutions is now to be the subject of further study.

The primary distributors and environmental areas form the basis of the actual structure plan (Fig 2). The primary road network consists of the main radial routes, for which realignments and new lines are proposed in some cases, the outer ring road and the inner ring road for which a new route is proposed in the south-eastern section. Strenuous efforts have been made to define environmental areas which are not traversed by primary distributors. In one or two cases, however, this has not proved possible. Steps are proposed to provide primary education and local shopping within each of the environmental areas where these are not already in existence.

The central area has been the subject of a separate report but it is also dealt with here in some detail. A transportation policy is described based on considerations of environment, accessibility and cost. It is accepted that there must be a policy of limitation on the use of the private car and that an attractive alternative must be provided in the form of an efficient public transport system. Because of

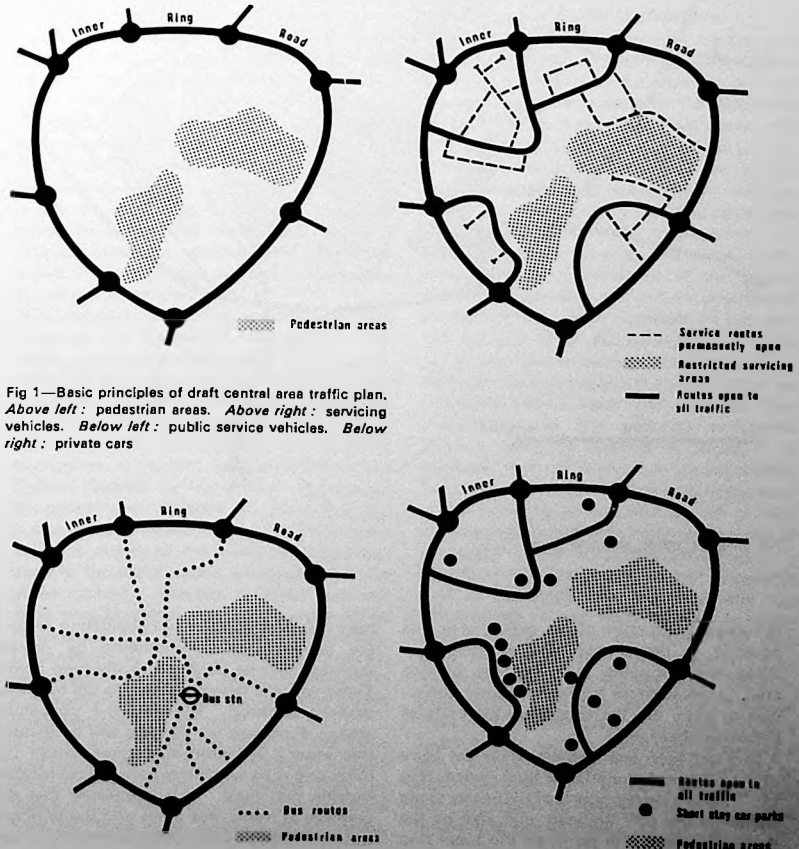

Fig 1—Basic principles of draft central area traffic plan. *Above left :* pedestrian areas. *Above right :* servicing vehicles. *Below left :* public service vehicles. *Below right :* private cars

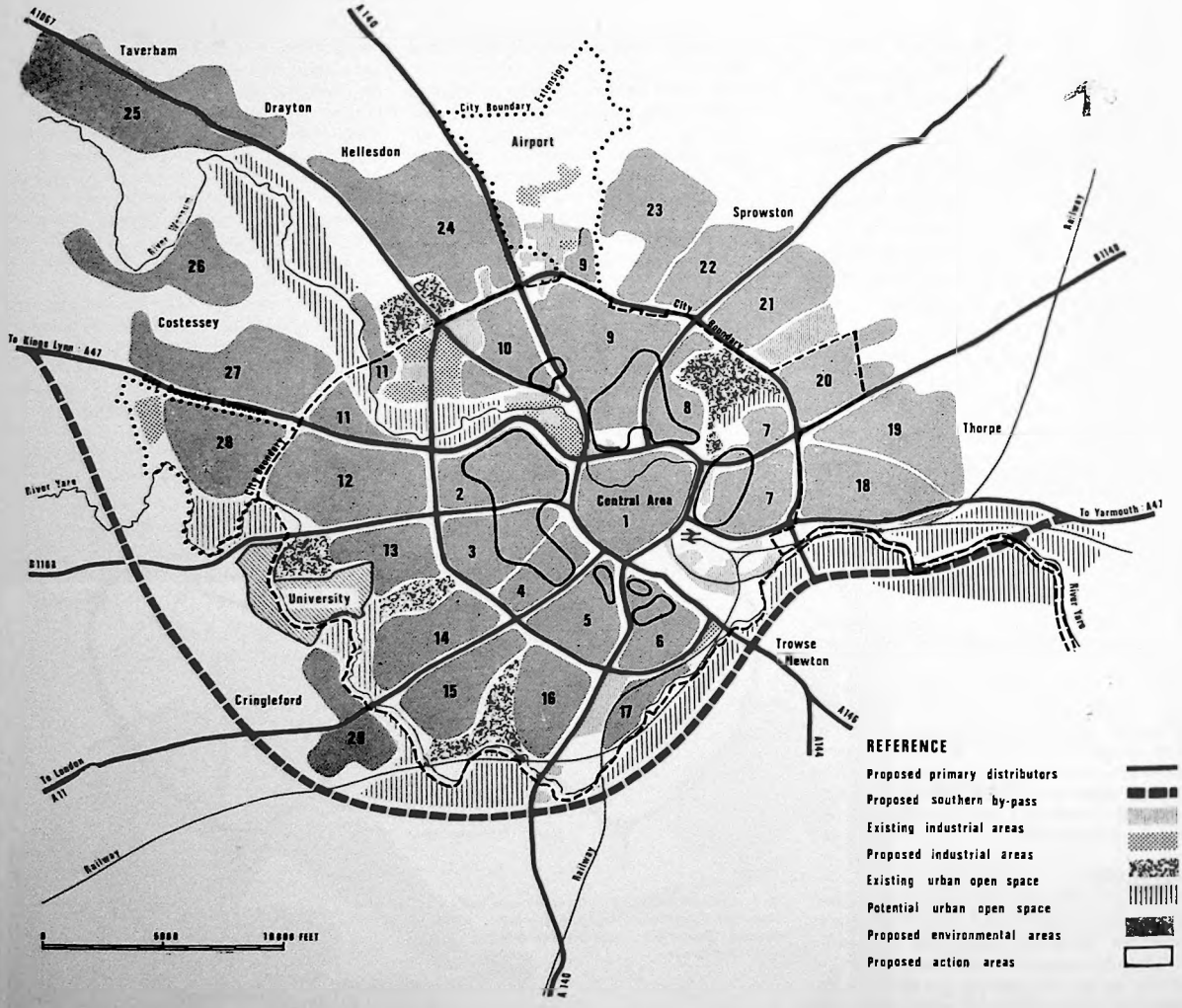

Fig 2—Draft urban structure plan

the existing structure of the central area it is possible to define two distinct pedestrian areas—the shopping area and the historic area. Limited times for servicing and restriction of entry are the suggested methods of achieving these aims.

A ring and loop arrangement forms the basis of the proposed central area road system (Fig 1). This is a development of proposals made earlier by the City Engineer and also by the Buchanan team. In principle the inner ring road will provide the main circulation around the central area. Penetration by private transport will be confined to the loop roads. These will also provide access to the car parks without adversely affecting the pedestrian areas. Proposed car parking will be divided into some 8,000 short-stay spaces within the inner ring road with long-term spaces located outside that road. It is suggested that the creation of traffic-free areas and the principle of loop roads tend to conflict with the requirements of public transport. To overcome this additional routes will be provided.

Many of these proposals in the draft urban structure plan are of a general nature only and one must guess that some are intuitive. The plan admits that their implementation will not be easy although it is considered that the plan is practicable and financially feasible. It will be interesting to see how these draft proposals stand up to the more searching studies now being undertaken.

planners and the public

Planned development, or the apparent lack of it, is always a vexed question; and it is something which affects both town-dweller and countryman alike. Most of us are familiar with the sudden appearance of what we consider to be an architectural monstrosity, quite out of character with its surroundings, and which—had we received early warning of its coming—would doubtless have provoked strong resistance.

too much secrecy

The principal reason underlying such a singular lack of communication with those most directly concerned is, in many cases, through a marked reluctance on the part of planning authorities to publicise not only their discussions, but, more seriously, applications as and when they are received. For in many areas deliberations are held behind locked doors and in strict secrecy, apparently because many councils regard the presence of the public and press as an intrusion not to be tolerated under any circumstances. But surely a better way to regard it would be as a means of promoting residents' interest in the overall planning, development and improvement of the area in which they live. And at the same time allowing public opinion and debate to contribute to the discussion.

One must, however, be fair to all local authorities and point out that for a long time it has been possible for the public to see schedules of planning applications at council offices. However, relatively few people are aware of this, and even fewer take advantage of the facility offered.

Thus, in many areas it is undoubtedly high time that the public—the ratepayers—were given greater opportunities to know something of the planning applications to be considered by their elected representatives *before* the final conclusions are arrived at. A decision made recently by the Planning Committee of Havant and Waterloo Urban District Council in Hampshire signifies an important step forward in involving the public in planning decisions. This is to make available copies of the schedule of applications in the eight public libraries within the urban district. Bearing in mind that this document contains a list of schemes to be considered by the planning committee, presentation in the libraries means that the public enjoy far greater opportunities to find out exactly the proposals being made before final judgement is reached.

Another helpful decision taken in the same area—this time by the Hampshire County Planning Committee—has meant that the detailed plans which accompany applications have also been made available for inspection by the public. The authority being reported as finding "no fundamental legal reason" to prevent this, providing that no attempts were made to copy what is shown.

In our villages it is the parish councils to whom the residents look to safeguard their civic interests. For, morally if not legally, these bodies are the guardians of the countryside and are looked upon to safeguard the character and beauty which is the rightful heritage of each and every one of us. But paradoxically parish councillors know little more about planning applications than do the public. They rely to a great extent upon the watchfulness of the local representative on the rural district council—who is not invariably also a member of the parish council—to report any matters likely to affect the village. Thus, he has only to miss a meeting at district level—through such everyday causes as sickness or holiday—and an application of great significance can be ratified without dissent.

circulating planning schedules

A simple answer here would be for rural district councils to circulate copies of their planning schedules to the parishes, in much the same way as is done to the libraries at Havant. There is surely no valid reason why this could not be done. Indeed, in Oxfordshire something on these lines has already been adopted—with considerable success. In brief, all applicants for planning permission are advised that when applications are submitted to the planning authority—in this case, area sub-committees of the county planning committee and not, as often found elsewhere, rural district councils—a summary and site plan must also be sent direct to the parish council concerned. The parishes are asked to make any relevant comments on the proposals before them and to send their observations to the planning committee without delay—if nothing is heard it is assumed that the parish has no objections. Thus, the parish councils are kept adequately in the planning picture and the hit or miss attitude—still, unhappily, common in many of our rural areas—is completely eliminated.

People have for too long been kept in the dark until it has been too late, and this has undoubtedly led to more trouble between local authorities and the community they serve than any other civic function. Unfortunately there are still too many councils which regard planning as a kind of sacred ritual in which the public is involved only as a spectator and not as a participant. Hampshire and Oxfordshire at least do not subscribe to this viewpoint. It is to be hoped that their approach will be adopted in those areas where it is still so obviously lacking.

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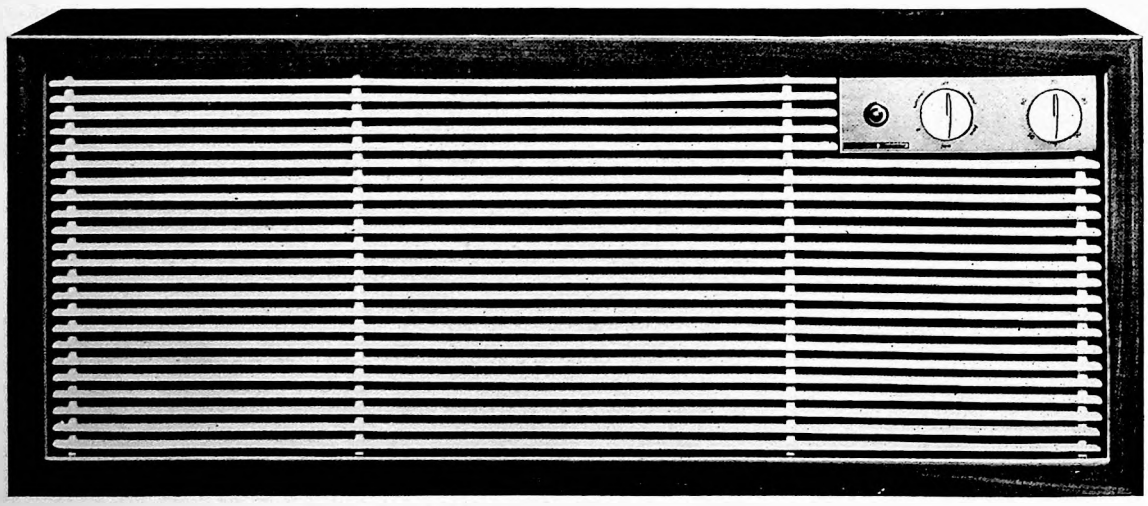

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books

...ovi... it to live in

Climate for Living, by Anthony Tucker. Macdonald & Company Limited, 1967. Price 5s.

Many leading engineers, architects and city designers now realise the need to overcome the effects of climate on modern building methods and the importance of creating a suitable environment. Mr Tucker's book explains how the traditional methods of laboriously placing brick upon brick, and primitive methods of heating only lead to superficial economies, which create waste and discomfort. He makes a plea for the total electric new town, where good thermal insulation can be made available at the turn of a switch.

Mr Tucker discusses fully the standards for creating a suitable climate for living and working; the advantages of using electrical energy for transport and communications; and the use of computers to provide integrated public services. "Planners and Engineers", says Mr Tucker," are now concerned first and foremost with the creation of environments that are sympathetic to human needs . . . "Most readers would not disagree with this statement until faced with the "artists impressions", where the physical environment illustrated can only be described as appalling. Despite this, it is a simple and easy booklet to read, and may help to reduce the wide gap between modern technology and its uses in urban living.

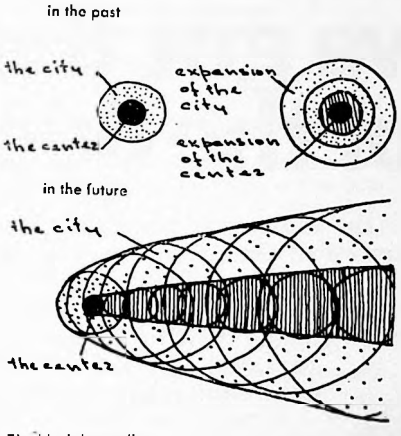
Jim Antoniou

entopias

Between Dystopia and Utopia, by Constantinos A Doxiadis. Faber & Faber, 1968. Price 25s.

"Human happiness", Doxiadis claims, "is the ultimate goal of the creation of human settlements"; and this small book is the text of three reflective lectures on some realities and dreams of ideal cities. In spite of Man's wish to create *Utopias,* "no places", nearly all our cities are *Dystopias,* "bad places" : instead Doxiadis would seek to fuse dreams with reality, and create *Entopias,* "in-places".

This is a gentle, philosophical ramble by the man, who since the death of Le Corbusier, is the best known of the world's physical planners. His, is the idea of *Ekistics,* which he defines as the science of human settlements. One of his greatest concepts is the *Ecumenopolis*—the universal city which is gradually emerging as a linked series of linear, urbanised clusters along the most attractive belts of the Earth's surface. Another of his contributions to planning theory is the *Dynapolis,* a "dynamic city" which ideally, has a parabolic



The ideal dynapolis

uni-directional growth which can expand in space and time. He has decided that the five elements of human settlement are Nature, Man, Shells and Networks—listed in the order they appeared on Earth.

Doxiadis is an ideas-man. He moves, thinks and proceeds too rapidly to write much; so that these lectures, presented at Trinity College, Hartford, Connecticut, in 1966, are of much interest in pinpointing his beliefs. This truly larger-than-life figure attempts to camouflage his impatient and very businesslike genius behind a mask of humility; yet he does genuinely reduce every issue to its human significance, and society can only trust planners whose approach this is. This book is wise, brief and a little superficial; but it reveals the humanity and philosophy of the man. It is worth reading.

Shean McConnell

external walls

External Walls, by Wilhelm Schaupp. Crosby Lockwood & Son. Price 63s.

Translated from the German, this publication may very well have occurred at an opportune time, when the building industry in this country is gradually moving towards metrication, and therefore possibly towards the reallsation of an international building technology. This publication has an additional merit in that it is very well illustrated, particularly when it concerns itself with matters of maintenance and deterioration. Essentially the book covers the traditional materials used in the construction of external walls, and has very little to do with componentisation. After commencing on a brief but succinct introduction on the environmental aspects of walling, the book deals respectively with plaster rendering, brickwork, ceramics, stone, concrete and asbestos cement. The new materials referred to include aluminium, sheet metal and glass. Not only does this publication deal with the performance of these materials, but also refers to standards from many countries (including Britain) relating to manufacture and testing. A book which is well worth obtaining by not only the technically orientated architect, because of its concise style and simple presentation.

Kenneth Claxton

history of town planning

Geschichte des Stadtebaues, vol. III: *Die Neuzeit,* by Ernst Egli. Eugen Rentsch Verlag, Erlenbach-Zurich. Price 70 Swiss francs.

Readers of this journal who have followed the series of articles dealing with the main periods in the history of town planning may wish to know of a comprehensive, overall study of the subject. Dr Egli, the Professor of Town Planning at the Zurich Polytechnic University, has recently completed just such a work. The present volume, devoted to the period from the Renaissance to the present day, is the third of a large-scale survey that covers the subject from the dawn of urban civilisation in all five continents. That comprehensiveness makes the work unique: it is as informative of developments in the Near and Far East as in Maya America or in contemporary Europe, and deals with each in turn perceptively, taking in sociological, economic and tectonic aspects with sovereign erudition. Well illustrated with plans, maps, engravings and photographs, it deserves to be published in an English edition.

René Elvin

books and publications received

Village Study (series). Studies by Kent County Planning Department on the character of Kent villages and on features worthy of conservation, indicating where opportunities for improvement exist. Villages treated in the series are Brenchley, Farningham, Goudhurst, Wingham, and Yalding.

Directory of Construction Statistics. Ministry of Public Building and Works. HMSO. Price 17s 6d.

Building Construction, volume 4 (second edition), by J K McKay. Longmans, Green and Company Limited. Price 35s.

The Coasts of South Wales and the Severn Estuary. National Parks Commission. HMSO. Price 30s.

Cost of Road Accidents in Great Britain, by R F F Dawson. Road Research Laboratory, Ministry of Transport. (RRL Report LR79).

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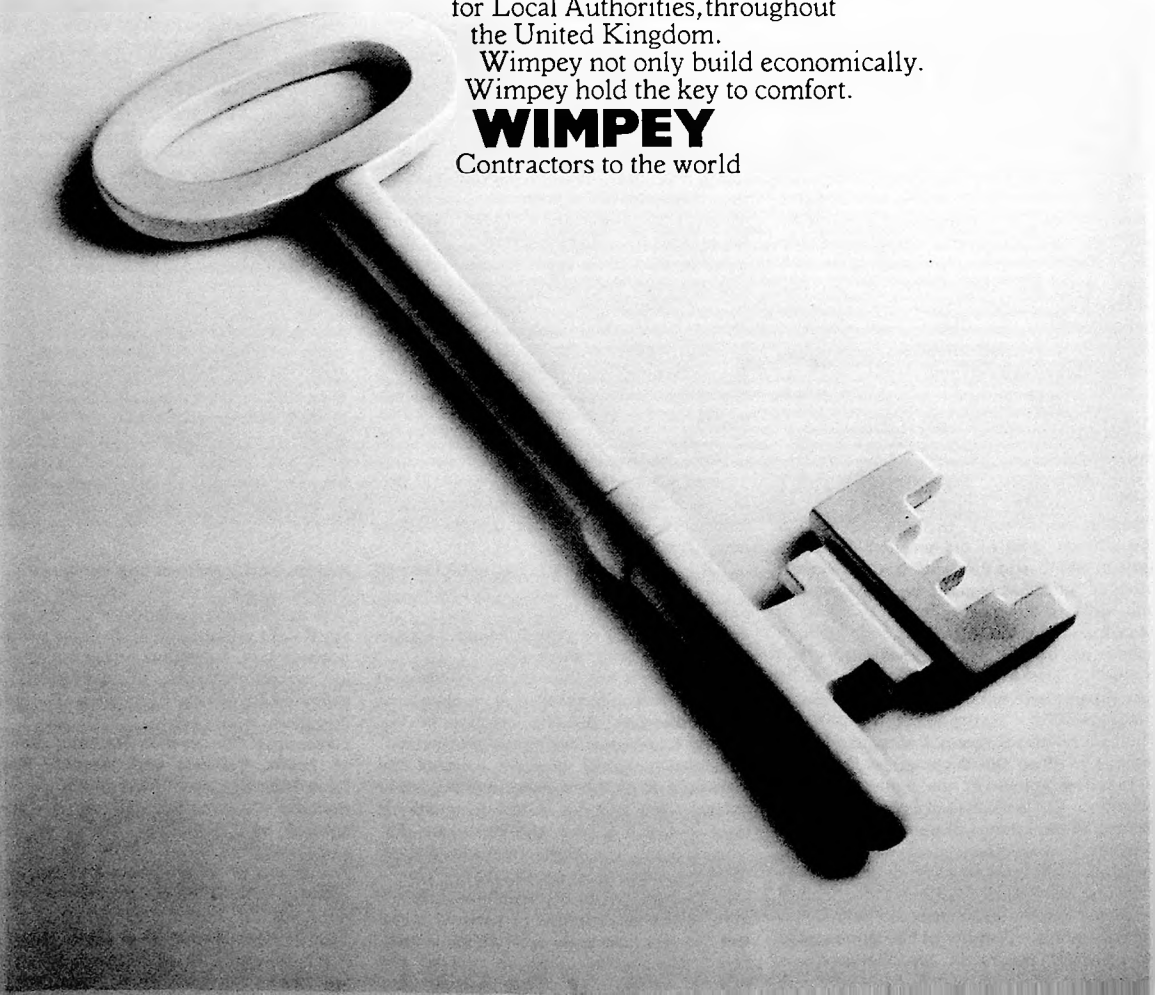


news review

...rai competition
The Fellowship Houses Trust, of Weybridge, ...rrey, is promoting a single-stage competition for the design of its first purpose-built block of flatlets at Byfleet, Surrey. The site is about an acre in size, and the Trust proposes to put up a building not more than two storeys high and containing about 24 independent flatlets, each equipped with its own kitchen. The value of the project, including site costs, is estimated at £100,000. The prizes are: first, £750; second, £500; and third, £250. Applications can be made to L P Leech, Secretary, the Fellowship Houses Trust, Clock House, Byfleet, Weybridge, Surrey, on payment of a registration fee of two guineas.

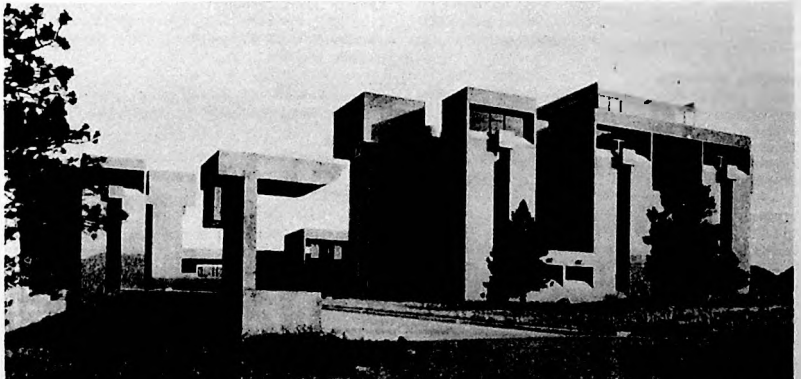
elevated walkways
An advisory group has been set up by the MoHLG to consider planning and legal problems raised by the provision of elevated pedestrian walkways in urban areas. The group will formulate a general code for such walkways and advise on any legislation that may be required. The setting up of the group is particularly welcome in view of the increasing number of local authorities considering the use of this form of urban structure.

the thames for leisure
A Thames Action Sub-Committee with special responsibility for encouraging the use of The Thames within Greater London as an amenity for leisure is to be set up by the GLC. In conjunction with the London Boroughs Association the GLC will be initiating, encouraging, and supporting action for the carrying out of specific projects and for general improvement of amenities.

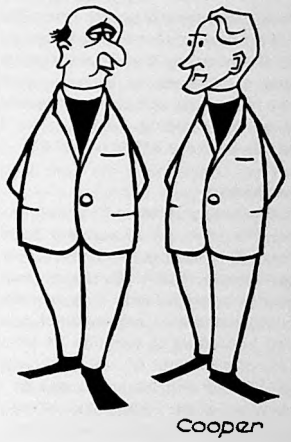
building regulations relaxed
The RIBA has published a list of selected cases of relaxations granted by local authorities under the Building Regulations 1965. The relaxations are examples of those granted by local authorities in England and Wales as opposed to those which have been granted by the MoHLG. This information will be of use to architects as well as local authorities who may want to know about relaxations already granted in other areas. Two other instalments of relaxations will be published later this year.

planning permission
Local authorities have been told by the MoHLG that conditions imposed in granting planning permissions should be "necessary, relevant, enforceable, precise, and reasonable". The advice is given to remove misunderstanding about the drafting and use of conditions in planning permissions. These should be capable of being implemented by the developer. They should never be imposed, the Ministry's circular says, simply because they will do no harm. If it is to be imposed at all, a condition must do some good.

furniture for tomorrow
An interesting feature of this year's Ideal Home Exhibition was the MoPBW house which showed prototypes of the kind of furniture that may be increasingly used to make better use of living space and to cater for the needs of growing families. The prototypes are being developed for use in the Ministry's future furnishing schemes, but the ideas embodied in the designs could well be given wider application. The easy chairs in the display can be converted to unit chairs, and a unit settee can be assembled to seat a varying number of people. The bases of all the units can be used for storage, a good idea for houses in which space is at a premium.



The new offices and laboratories of the National Centre for Atmospheric Research at Boulder, Colorado, USA, are housed in two tower blocks linked by a two-storey [illegible] of *in situ* exposed concrete; exterior walls have been brush-hammered and sand-blasted to reveal the red limestone aggregate. The architects were I M Pei and Partners, and the structural engineers Welskoph and Pickworth.



"All these new universities are just cathedral-substitutes for architects"

transport co-ordination
The firms of Goudappel & Coffeng of Deventer, Holland, and Arthur Henderson Consultants, London, have formed an association for carrying out traffic engineering and transport planning. The firms expect to deal with land-use problems of industrial, commercial, recreational, and residential development. Their specialists will deal with particular problems of urban traffic, railways, passenger and freight terminals, airport planning, containerisation, and pedestrian and planning requirements.

industrial architecture award
The Financial Times is to include all industrial buildings in its annual award scheme for outstanding works for industrial architecture. The two architect assessors for the awards are Lord Holford and Alex Gordon; the industrialist assessor is Sir Colin Anderson. The deadline for nominations, which must be restricted to buildings completed within the two years ending December 31, 1967, is June 7th next. Nomination forms and particulars of the conditions can be obtained from *The Financial Times*.

building cost appraisal
A report on total cost-in-use of buildings, *Total Building Cost Appraisal*, has been published by the RICS. Prepared by [illegible]

Southwell, the report is part of a detailed study of building design/cost relationships with the object of enlarging the application of cost planning techniques to include all factors relevant to arriving at balanced decisions on behalf of the building owner. The Report is available from the RICS, priced £1.

new directory

The RIBA is to publish a Directory of Architectural Practices, as a separate book. The directory of practices at present included in the annual RIBA Directory will also continue to be published. The new directory will contain a list of architectural practices, grouped according to location of offices, as well as information of value to potential clients. There will be a flat charge of £5 for a standard entry. An additional fee of £20 will be charged for expanded entries.

notices

With the near completion of Hemel Hempstead Civic Centre, Clifford Culpin and Partners have closed their Hemel Hempstead office. They have now opened an additional office at 399 Strand, WC2. Their head office is at Priory House, St John's Square, EC1.

• • •

Michael Hanson, press officer of the RIBA since 1965, has left to devote more time to writing and to act as technical adviser on industrialised building to W and C French Limited, building contractors.

Tower Hamlets, Rowlett Street, built for the GLC and designed by Erno Goldfinger. The 26-storey block, which consists of 126 flats and 10 maisonettes, is part of a 2½-acre site

symposium on urban renewal

A post-graduate course on Urban Renewal will be held at the University of Salford, Lancashire, on May 29th and 30th. The subjects to be dealt with are: the meaning of citizen participation, how the citizen can participate in planning, the role of regional bodies and local societies, the citizen and transportation, and the Planning Advisory Group Report and future policy.

chief officer seminars

The Institute of Local Government Studies, University of Birmingham, is to hold its first two seminars for chief officers in September 1968 and April 1969. The April seminar will be held at Wast Hills House, Kings Norton. The subject of the seminars will be Measurement and Control in Local Government.

planning symposium

A symposium on the theme "Housing and offices: current social science research reports" will be held at the Welsh School of Architecture, University of Wales Institute of Science and Technology, Cathays Park, Cardiff, on Friday, May 17th, 1968, from 10.0 am to 5.0 pm. Speakers will include Dr Vere Hole, Building Research Station; Miss E Gittus, Dundee University; and David Canter, University of Strathclyde. The fee for practitioners is 5 guineas.

london airport

G W Dunton, of Frederick Gibberd and Partners, is to give a talk on "London Airport" on May 6th, 7.45 pm, at Headstone Hotel, North Harrow. The evening is being organised by the North West London Society of Architects.

environmental studies

Courses at the AA's Centre for Advanced Studies in Environment from March to June have been revised as follows: April 22nd-25th, Urbanism Seminar; May 6-9th, Landscape 3; May 28-30th, Metrication and dimensional co-ordination 2; June 4-6th, Component and product; June 11-13th, Acoustics Symposium; June 17th-21st, Hospital planning seminar; June 25-27th, Project leadership.

building for education

"Building for Education—Looking Forward" is the theme of this year's RIBA Conference, which is being held at Cambridge University from Wednesday, June 26th, to Saturday, June 29th. Papers include "Future Patterns of Resources for Education", by Professor John Vaizey, Brunel University; and "Architectural Implications", by Sir Leslie Martin. W D Lacey, Chief Architect, DES, will sum up the conference.

building exhibition

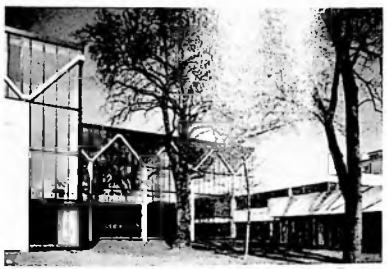
The Ministry of Public Building and Works is holding its Building Exhibition this year at Bristol. The exhibition will be held at Hengrove Park, Bristol, from September 12-18th. Applications for space in the exhibition should be made to The Chief Information Officer at the Ministry.

others

The Central Committee for the Architectural Advisory Panels will hold its conference at the RIBA on April 26th. The conference will start at 2.15 pm. Speakers will include Mrs Sheila Haywood on "Landscaping for Industrialised Building" and Clifford E Culpin on "Low Cost Housing".

• • •

The International Federation of Landscape Architects will hold its next conference in Montreal, Canada, from June 15th to 20th. The theme of the conference will be planning for leisure and the role of the landscape architect in the planning, development, and conservation of non-urban environments for leisure.



Elevation of the main pool hall of the new Putney Swimming Baths, built for the London Borough of Wandsworth. The architects were Powell and Moya

The Seventh Eurogypsum Congress is to be held in London from May 14th to 17th. Working sessions will be held in the Hyde Park suite of the Mount Royal Hotel, Marble Arch. Further information can be had from Conference Services, 11 Whitehall Court, London, SW1.

• • •

The Fourth Congress of the International Council for Building Research Studies and Documentation—CIB—is to be held in Ottawa and Washington from October 7th to 16th. The conference will provide a world review of trends in building research. Further information is available from M K Ward, Secretary, Fourth International Congress of CIB, c/o Division of Building Research, National Research Council of Canada, Ottawa, Canada.

• • •

An international conference on structure, solid mechanics and engineering design in civil engineering materials is being organised by the Concrete Society in conjunction with the University of Southampton. The conference will be held in Southampton from April 21st to 25th. Details are available from the Secretary, M Te'eni, Department of Civil Engineering, University of Southampton, Southampton.

• • •

"Architecture as a Social Factor' is the theme of the Tenth UIA Congress, which is being held in Buenos Aires from October 10th to 15th, 1969.

appointments

Kenneth Galley, planning policy officer, Newcastle upon Tyne CBC, has been promoted city planning officer in succession to Dr Wilfred Burns, who becomes chief planner, MoHLG.

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George F McDonic, acting county planning officer, Wiltshire, has been appointed county planning officer.

• • •

L C Kitching, deputy county planning officer, Hertfordshire, has been promoted county planning officer in succession to E H Doubleday, who has retired.

• • •

Maurice John Thurmott, principal architect in the city architect's department, Leeds, has been promoted assistant city architect (housing) in succession to P G James, who has been appointed deputy city architect.

• • •

S J Murphy, group architect, Westminster City Council, has been appointed deputy borough architect and planner, London Borough of Harrow.

• • •

Miss Moira Shield, director of planning, London Borough of Brent, has been appointed chief research planner, GLC.

notices and news

The next AOA Annual General Meeting will be held in Manchester on May 17th and 18th, the programme for which is as follows:

Friday, May 17th

General Council Meeting	3.00–5.00 pm
Reception and Buffet	5.30–6.30 pm
Annual General Meeting	6.30–9.00 pm

Saturday, May 18th

Tour and Exhibition	9.00 am–1.00 pm

The events on Friday will be held in the Building and Design Centre, 115 Portland Street, Manchester 1. The reception and buffet, which is being held in the Building Centre's licensed restaurant, should enable members to meet informally in congenial surroundings. At the AGM, which follows, the welcoming address will be given by Alderman D J Edwards, Chairman of the Manchester Town Planning Committee, and it is hoped that he will be present at the reception.

On Saturday the tour will start with an introductory talk by a member of the Manchester City Planning Department. The tour will include visits to redevelopment areas, the university, and work of the City Architect. Members will also have an opportunity to see an exhibition of city planning and local authority architects' work. The cost of the coach tour will be about 5s, payable on the day.

arrangements

Hotel accommodation has been reserved in a block booking at the Brookfield Hotel, Oxford Place, Victoria Park, Manchester, 14. The charge for bed and breakfast will be 40s per person. Parking facilities are available at or near the hotel, and there is a frequent bus service to the city centre, which is a ten-minute drive away. It will be necessary for some members to share twin-bedded rooms. Those requiring accommodation will be provided with maps showing location of the hotel, bus routes, one-way streets, car parks, etc, with the confirmation of their booking. Cancellations must be passed to the AGM Secretary not later than Friday, May 10th, 1968. Members will receive booking forms through the post; they are asked to complete and return them by April 30th together with remittance for the reception and buffet to: AGM Secretary, AOA, Manchester Region, c/o 13 Bentley Road, Manchester 21 (telephone CHO 2159). A copy of the booking form appears below.

hotels

For the convenience of members wishing to make their own arrangements for accommodation here is a list of local hotels. Near the city centre: The New Millgate Hotel, Long Millgate, Manchester 3, telephone BLA 9183/4/5 (b & b 42s 6d); Grosvenor Hotel, Deansgate, Manchester 3, telephone DEA 5711 (b & b about 52s 6d).

Within five miles of the city centre: Jerralea Hotel, 19-21 Anson Road, Victoria Park, Manchester 14, telephone Rusholme 1521 (b & b about 50s); Sapphire Villa Hotel, Park Crescent, Victoria Park, Manchester 14, telephone 3430 (b & b about 30s); Birchill Hotel, 141-3 Dickenson Road, Rusholme, telephone Rusholme 4618 (b & b about 30s); Glengarry Hotel, 139-141 Withington Road, Whalley Range, Manchester 16, telephone Moss Side 1711 (b & b about 35s); Simpsons Hotel, 122 Withington Road, Whalley Range, Manchester 16, telephone 226-2235/9 (b & b about 40s).

motions

Motions for inclusion on the agenda of the AGM must be submitted to the Association Secretary, W F Hurry, 126 Straight Road, Lexden, Colchester, Essex, not later than May 3rd. Both the proposer and seconder of any motion must be fully paid up members.

AOA ANNUAL GENERAL MEETING MANCHESTER 1968 BOOKING FORM

Will you be attending:
1 The Reception and Buffet*? Yes / No
2 The Annual General Meeting? Yes / No
3 Tour? Yes / No

Will you require:
1 A light snack at the Brookfield Hotel at Friday lunch time? Yes / No
2 Hotel accommodation on Friday night? Yes / No
Number of single rooms required .....
Number of double rooms required .....

Name in full: Mr/Mrs/Miss .....

Address: .....

Telephone number: .....

* Cost 12s 6d per person. Crossed cheques or postal orders should be made payable to the Association of Official Architects, and enclosed with this booking form.

salary negotiations

After repeated efforts on the part of AOA a meeting of the Staff Side of the Grading Committee took place recently. R P Callear, Wolverhampton, represented the Association at the meeting. A discussion of the new salary scales proposed by the Professional Association took place, and finally it was conceded that the claim could go forward though more evidence would be needed to substantiate it. Another meeting of the committee is to be held shortly to bring forward the evidence required. AOA in conjunction with the other Professional Associations will press on with its policy of forcing a meeting of the Grading Committee.

election

John Pogson, Assistant City Architect, Norwich, is standing for the national executive of NALGO. As East Anglia representative on the AOA Council, Mr Pogson is an active member of the Association. Members of NALGO in the NALGO Eastern District (Norfolk, Suffolk, Essex, Hertfordshire, Bedfordshire, and Cambridgeshire) are asked to give him their support.

notes

At a recent meeting of the General Council the role of the office representative in the Association was discussed. The general feeling was that the role of the representative was crucial in maintaining membership and liaison among members, and ways were discussed for giving representatives a more worthwhile role.

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The Association fully support the proposal of the Joint Committee of Professional Officers Associations that the pay and service negotiations should come under the purview of the JNC, which is at present for chief officers only.

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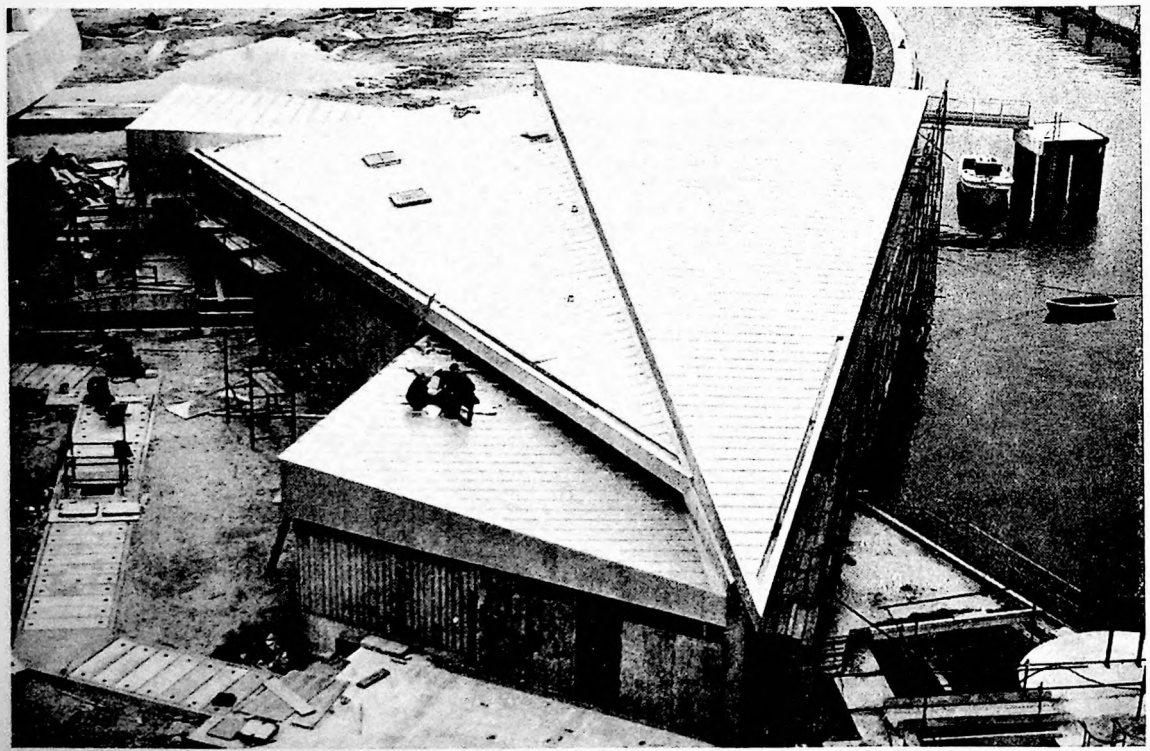
The Association would welcome more chief officers becoming members, and visualise that eventually there will be the only association covering all architects working in local government.

residential conference

A residential conference on Urban Renewal and Redevelopment in Wessex is being organised by the Wiltshire and Dorset Society of Architects at Connaught Hall of Residence, University of Southampton, from 6.0 pm on Friday, April 19th, to 6.0 pm on Sunday, April 21st. Speakers will include J Scoble, Chairman of S W Region Economic Planning Board; G F McDonic, Acting County Planning Officer of Wiltshire; Professor Colin Buchanan; and Jack Whittle, GLC.

Broderick roofings cover whatever you have in mind



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Address _____

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design criteria for movement

GEOMETRIC DESIGN FOR THE MAXIMUM RIGID DESIGN VEHICLE — 12 METRES

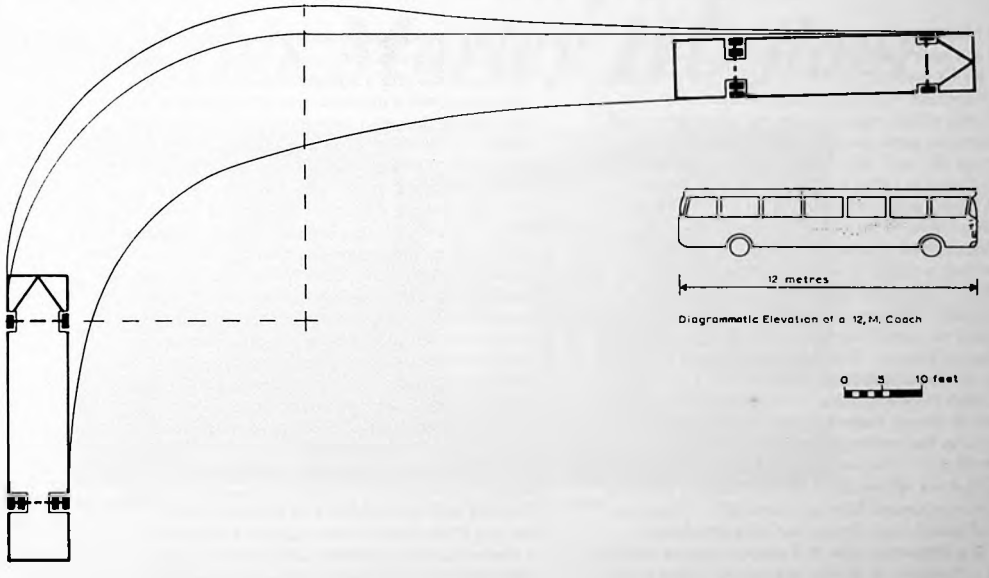
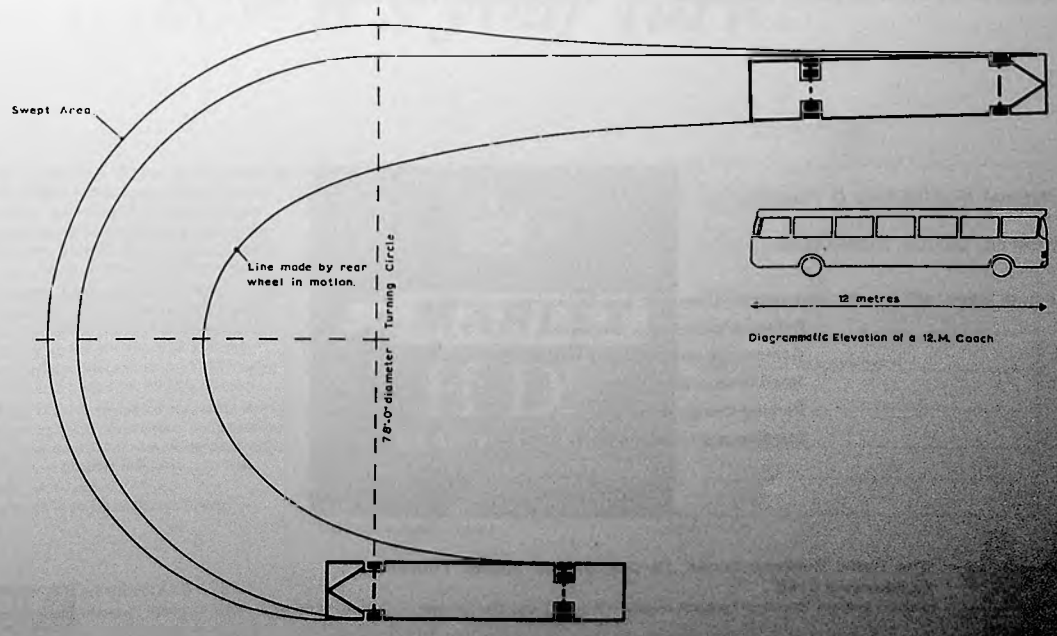


Fig 1 (*above*)—Diagram showing the geometrical shape of a 12 metre (39 ft 4 in) by 2·5 metre (8 ft 2½ in) touring coach turning a 90° corner. This illustrates the inside splay created by the inner rear wheel and the outside line formed by the front overhang. They combine to form the swept area

Fig 2 (*below*)—Diagram shows the geometrical shape of the 12 metre (39 ft 4 in) by 2·5 metre (8 ft 2½ in) touring coach turning a 180° U-turn. This illustrates the extension of the inside splay and swept area for turns larger than 90°



maximum rigid design vehicle—12 metre bus and touring coach turning 90° and 180° manoeuvres

The Ministry of Transport has now announced that the new maximum length for rigid vehicles will be 12 metres (39 ft 4 in). Figs 1 and 2 show the minimum movement requirements of a 12 metre coach and illustrate the geometric areas required by such vehicles when manoeuvring through 90° and 180° turns. The vehicle sizes are 12 metres (39 ft 4 in) long and 2·5 metres (8 ft 2½ in) wide; it turns in a 78 ft 0 in diameter turning circle. This particular coach is similar to Continental standard vehicles and the front overhang is longer than the average British vehicle. This extra length permits generous front entrances. These are in common use in Europe and will be more frequently used as standard design in Britain. The illustrations show that with this extra length the outer swept area becomes more extensive. It is therefore an essential design feature to allow for when designing for buildings, yards, terminals and street layouts. The overhang at the front of the vehicle does not turn in a circular motion until the vehicle has passed through about 90°. The inner line of track is not circular but of a spiral form and this determines the true shape a corner should take. However, if corners are set out using single curves, the radius required has to be increased. The spiral shape becomes less important as radius dimensions are increased. For low speed designs it is desirable to incorporate spiral curves as they are more economical and allow greater efficiency of movement. The inner line of the spiral is created by the rear wheels which are not steered.

The vehicle requires considerable distance to manoeuvre into its full turning circle. The return of the vehicle into a straight line of motion does not occur until a distance well after the vehicle has passed the point where the front wheels are straight. The front wheels are further round the curve than the rear wheels which are unsteered and are dragged round. The overhang at the front cannot change its circular motion until the rest of the vehicle has straightened up. The area contained by the curves made by the front overhang line and the track of the inner rear wheel in motion is known as the "swept area". It is most important that the full implications of the swept area are taken into account at the earliest design stage possible, whatever the project or development may be. The need for using correct and up-to-date criteria is demonstrated by comparing Figs 1 and 2 with those illustrated in *OAP* Information Sheet 2 showing the 8 metre (26 ft 0 in) bus. Inadequate criteria or old design standards can be both dangerous to road users as well as expensive to operators and owners of property. Although the (26 ft 0 in) 8 metre bus is in common use in Britain it is important to accommodate the requirements of the 12 metre bus where required in future, thus assisting free flow and efficiency of movement and service.

The information shown on this Information Sheet illustrates minimum design criteria. Problems involving variable speeds and curves should be directed to the Traffic Research Centre.

Official Architecture & Planning

TRAFFIC DESIGN STANDARDS

Future issues will include Information Sheets on the following subjects:—

- **Refuse and Service Vehicles**
- **Commercial and Special Vehicles**
- **Road Design Standards**
- **Parking Design Standards**
- **Loading and Unloading Standards**

Prepared by: **The Traffic Research Centre, 13 Charterhouse Square, London, EC1.**
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plywood SfB Ri4 FD5A
Folder giving data on sizes, thicknesses, qualities, and suggested uses for Finnish birch plywoods, blockboards, and laminboards. Information from the Finnish Plywood Development Association, Finland House, Haymarket, London, SW1.

rainwater system SfB(38) Dn6 AD9C
Illustrated leaflet on the Aspect pvc 4 in and 5 in gutter rainwater systems designed to simplify erection problems. The leaflet describes the fitments and components available. Information from Allied Structural Plastics Limited, Luton Road, Dunstable, Beds.

industrialised building SfB Ba6 ZC2A
Booklet giving detailed specifications for the Resiform industrialised system, based on the use of a special type of glass fibre, modular, load-bearing panel. Information from William Old (Resiform) Limited, Old's Approach, Tolpits Lane, Watford, Hertfordshire.

decorative wall finish SfB Vv DY9A
Information sheet on Debtex, a glass mosaic decorative wall finish which is trowel applied and can be used on internal and external areas. Details from Debco Limited, 117/119 Manor Parade, Uxbridge Road, Hillingdon, Middx.

concrete formwork system SfB Eb2 CW6A
Handbook giving technical details concerning the Concrete Formwork System with information about components and examples of the system in use. Information from Concrete Formwork Limited, 189 Bath Road, Slough, Bucks.

concrete stitching SfB Ab5 CA9A
Folder giving specification for the repair of cracks in concrete roadways, airport runways, etc, by the Ceamar concrete stitching method. Copies available from E M Cromwell and Company Limited, Galloway Road, Bishop's Stortford, Hertfordshire.

central heating SfB(56) BX2C
A 66-page handbook, *The Repco Guide to Comfort*, supplies information concerning the design and installation of Repco skirting convector central heating systems. Copies are available from Bekon-Bell Limited, Farnham Road, Slough, Bucks.

screws and fasteners Sf3(20) GL2B
Folders with data concerning GKN screws and fasteners, and including modern developments in the field. GKN Screws and Fasteners Limited, PO 61, Heath Street, Smethwick, Warley, Worcs.

system housing SfB Ba6 BD9A
Brochure giving details of Bullock System Housing using timber frame construction. Technical literature available from D T Bullock and Company Limited, Northgate, Aldridge, Staffs.

building in steel SfB Md2 SD5D
Brochure setting forth the advantages of building in steel, detailing housing requirements, the properties of steel as a building material, costs, and recent design developments. Information from Steel Sheet Information and Development Association, Albany House, Petty France, London, SW1.

portal building frames SfB(2) Gf CF6D
Brochure on Crendon Portal Building Frames, made from precast reinforced concrete and designed for wide application in industry. Information from Crendon Concrete Company Limited, Thame Road, Long Crendon, Bucks.